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MARSHALL SKI AREA'S PAST PROBLEMS AND FUTURE
SOLUTIONS: THE FEASIBILITY OF SNOWMAKING

By

James Hall Burns

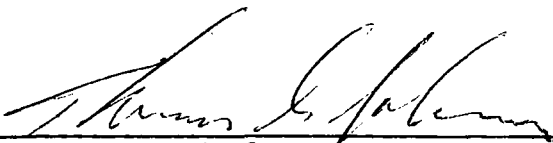
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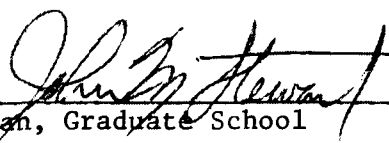
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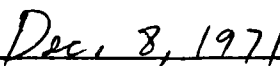
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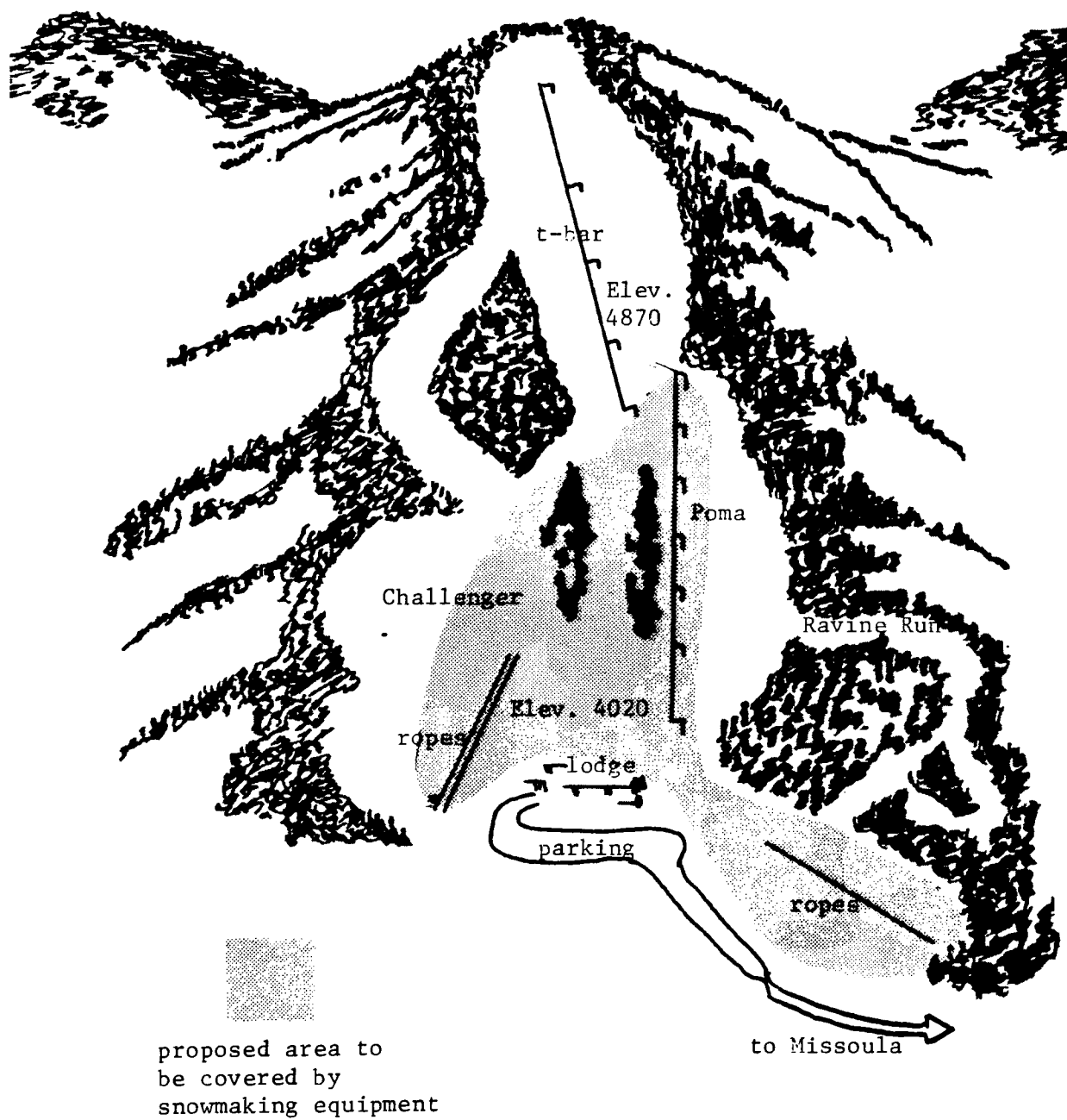
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MARSHALL SKI AREA



PREFACE

As a professional ski instructor and graduate student in business I have taken an interest in the management and operation of ski areas. During my last two years of undergraduate studies at the University of Montana I taught skiing at Marshall Ski Area, a small family-owned operation just a few miles from the Missoula city limits. The factors that have combined to make Marshall a profitable and growing concern create an interesting history.

Marshall Ski Area is located at the head of Marshall Canyon seven miles east of Missoula on Montana Highway 200. Two and a half miles of the drive is up a scenic mountain road. Marshall is 160 acres of timber and well-groomed ski slopes. The area is surrounded by land belonging to the U. S. Forest Service and the Anaconda Company. At the bottom there are four rope tows serving a number of novice and intermediate runs. A Poma lift in front of the lodge stretches along a steep slope further up the mountain and disappears over the ridge giving access to runs 3000 feet and longer. Paralleling the Poma lift is a string of mercury vapor lights that provide local residents with night skiing five days a week during the season. A new t-bar lift above the Poma services some of the best intermediate slopes in Montana. Next to the parking lot is the combined ski lodge and residence of the Green family, owners and operators of Marshall for the past thirteen years.

Coming out from Michigan in the summer of 1956, the Greens left behind many friends, a home and good jobs to develop a primitive ski area and farm into a full-scale, self-supporting winter sports center. The fulfillment of their dream is just beginning to materialize. Making the best of many hardships and poor snow years, they open each season hoping that favorable weather and crowds of skiers will finally put them in a financial position to develop Marshall's dormant potential and provide themselves with a comfortable living.

The first part of this study traces the chronology of Marshall's development, attempting to explain how each event has affected its growth to the present. A brief sketch of skiing at Marshall and in the Missoula area from its earliest stages gives the reader an understanding of the environment in which this business has evolved. The second part is concerned with the feasibility of installing artificial snowmaking equipment at Marshall that could eliminate the constant snow problems it has experienced over the past fifteen years.

Most of my information for this study was provided by Mr. and Mrs. Green, owners and operators of Marshall. Without their cooperation this study would not have been possible.

I am especially grateful to my wife Cherie who has given me much help and encouragement in completing this study.

TABLE OF CONTENTS

PART I. A HISTORY OF MARSHALL SKI AREA

Chapter

I. EARLY HISTORY OF SKIING IN MISSOULA	1
II. THE GREEN FAMILY IN MICHIGAN	4
III. THE FIRST YEAR	7
IV. AREA DEVELOPMENT	10
V. NIGHT SKIING	14
VI. LODGE AND SKI SHOP	17
VII. SKI SCHOOL	19
VIII. PROMOTION AND COMPETITION	21
IX. OPERATIONS AND FINANCES	23

PART II. HISTORY APPLIED TO THE FUTURE: THE FEASIBILITY OF SNOWMAKING AT MARSHALL

X. AREA POTENTIAL	37
Industry Comparisons	
Snow Problems	
XI. POTENTIAL OF SNOWMAKING	45
Industry Experience	
New Developments in Snowmaking	
Technical Considerations	
XII. ECONOMIC FEASIBILITY	51
Projected Revenues	
Projected Costs	

Break-Even Analysis
Payback Period Analysis
Projected Profits and Long-Run Potential

XIII. CONCLUSION AND RECOMMENDATIONS	79
BIBLIOGRAPHY	82

PART I

A HISTORY OF MARSHALL SKI AREA

CHAPTER I

EARLY HISTORY OF SKIING IN MISSOULA

As early as 1920 a group known as the Montana Mountaineers were conducting ski tours in the Missoula area. Members skied on Mount Sentinel, Mount Jumbo, Blue Mountain, Marshall Ridge and in the Grant Creek area.

Diamond Ski Area, twenty-two miles northeast of Missoula, was one of the first commercial ski ventures in the vicinity. Diamond Mountain started operations with crude, gas-powered rope tows in about 1939 and continued operating through the 1961-62 season.¹

Snow Park Ski Area was running a rope tow to the top of T. V. Mountain, fifteen miles north of Missoula, in 1954 and had a Poma lift servicing the lower slopes in 1958. In 1961 this Poma lift was moved to the other side of the mountain and became part of the facilities at the Missoula Snow Bowl Ski Area which incorporated in 1962. Snow Bowl is still operating on a seven-day-a-week basis and has a mile long chair lift and t-bar in addition to the lower Poma.²

A small area in Pattee Canyon was constructed before World War II, but operated only a few seasons due to lack of snow and poor business. This area was re-opened during the winter of 1966 with two rope tows

¹Grant Higgins, telephone interview held at Missoula, Montana, April 1969.

²Hellgate Ski Club, "Area News," Skidaddler (Vol. II, No. 1), November 1962.

servicing a 2000-foot intermediate slope. The snow cover was adequate, but very few skiers made use of the new run. It did not open the next season.³

Marshall was named after an early prospector whose claim was found on the Lerch farm just west of the canyon. The portion of the highway near the canyon is designated Marshall grade. The canyon, its creek and the high ridge above the canyon also bear his name. Marshall Moy, owner of the property just below the ski area, was named after this early treasure seeker.

The 160 acres now belonging to the Green family was originally homesteaded by a man named Somers. In 1919 Marshall's first resident skier, Tollef E. Olsen, purchased the property from Somers for \$500. Olsen, a native of Norway, visited his brother who already lived in the canyon, and decided to stay. The original house the Greens purchased with the property was built by Mr. Olsen who cut, peeled and hollowed the logs by hand. After living in the canyon for forty-two years, life became too hard for the aging Norwegian. He sold the property to the Glen Denny family for \$6000 and moved into Missoula in 1950.

Mr. Moy and some friends built the first ski tow in the canyon and cleared the first runs in 1937. The tow was constructed from old motorcycle parts and powered by a one-cylinder motor.⁴

The history of skiing activities from 1950 to the time the Greens purchased it is hazy. Mr. and Mrs. Green had only a vague idea about the volume of business or profits involved in the ski operation when they offered to buy it in 1955.

³ Hellgate Ski Club, "Area News," Skidaddler (Vol. V No. 5), February 1966.

⁴ Velma Green, unpublished manuscript.

When the Greens purchased Marshall in 1956, the Dennys had been operating three days each week. Mr. Green describes the tows as inadequate and worn out. He said that the runs were covered with large rocks and stumps and needed much grooming.⁵

The real story of Marshall begins in 1956 when the Greens purchased the canyon intending to turn it into a full-scale operation.

⁵ Si Green, series of interviews held at Marshall Ski Area, April and May 1969.

Chapter II

THE GREEN FAMILY IN MICHIGAN

In 1955 the Greens were living with their two children, John age ten and Carla not quite two, in a government housing project, Westacres, about nine miles from Pontiac, Michigan. Mr. Green had worked for General Motors as a millwright, building up twenty-five years' seniority and making a good wage. He had mentioned to his wife many times that he was weary of the eight-to-five grind at the plant and felt as though he wouldn't last until his retirement age of sixty-five, then fifteen years hence.

Mr. Green was active after work with hobbies and civic activities which seemed to keep him going, Mrs. Green said. He had a strong interest in skiing and was instrumental in establishing the non-profit Pontiac Ski Club of which he was president for five years. He then served as a director having less responsibility and fewer duties. With decreasing activity outside his regular job, Mr. Green became somewhat depressed and dissatisfied. A letter from Dr. George Heliker in the fall of 1955 was the incentive that Mr. Green needed to renew his interest in skiing. The Heliker family had been neighbors and close friends of the Greens in Westacres prior to their move to Missoula, Montana. While searching for a place to live in the country, the Helikers discovered Marshall Canyon. They felt sure this was the place that Mr. Green had always dreamed of owning. The letter from Dr.

Heliker described Marshall in detail and mentioned that it was for sale. He urged the Greens to take a vacation out west to have a look at this utopia.⁶

Not long afterward, the Greens were planning a vacation trip to Missoula and a visit to Dr. Heliker's promised land. Another letter from the Helikers said that Marshall was no longer for sale but left the vacation invitation open. The plans for the trip to Missoula had already been made so in December of 1955 Mr. and Mrs. Green and the children boarded the train for Montana.

During their stay in Missoula the Greens visited Marshall which matched Dr. Heliker's vivid description. The Greens made several trips to Marshall for some skiing and Si Green explored the area with great enthusiasm. One evening after skiing, Mrs. Green was visiting with the Dennys, owners of Marshall, who during the course of conversation offered to sell the canyon to the Greens at the original price of \$20,000. This came as a surprise since the Greens had come from Michigan thinking the Dennys were no longer interested in selling. After much discussion the Greens asked for option to buy until June 1, 1956. In exchange for \$250 the option was granted, and the Greens returned to Michigan intent on finding a means to finance the purchase of the Montana ski area.

The events that followed favored financing the Marshall deal. Mr. Green received G.M.'s top award of \$2500 for a suggestion he submitted to the plant. The Greens took this as a good sign and put their house up for sale which soon brought a buyer who was willing to pay the asking price of \$16,000.

⁶ Velma Green, unpublished manuscript.

Si Green, then age fifty, took leave of his job with General Motors to undertake a business venture he knew little about. It was only speculation that Marshall and skiing in the Missoula area would develop to a level where it could support Mr. Green and his family in the years to come. He had little knowledge about the economics of operating a ski area, but he did know that he would have to find another job until Marshall could be developed into a large-scale operation.

In May 1956 Mr. Green loaded the family belongings in a van and left to take command of his newly purchased ski area. After school was out in June, Mrs. Green and the two children left Westacres to make a new home in Marshall Canyon.

CHAPTER III

THE FIRST YEAR

The Greens purchased Marshall on contract for deed, paying \$10,000 down and assuming an obligation of about \$50 monthly until the remaining \$10,000 was paid off. This left them with about \$10,000 to finance improvements and supply their living needs.

For the \$20,000 they received 160 acres of partially cleared land, a three-bedroom log house, barn, garage, chicken house, corrals, ski lodge with food counter and a large fireplace, three rope tows and motors and some roughly-groomed slopes around the lodge. In addition, they acquired the big job of getting ready for the next season's snow and crowd of skiers.

The Greens, with the help of family and friends, spent the summer and fall reconditioning the house and ski lodge. Mr. Green spent most of his time grooming the slopes, tearing down old fences and rebuilding the delapidated rope tows. The parking lot needed enlarging, new trails needed clearing and there was wood to be cut for the fireplaces.

The most pressing problem was power. It was obvious that if Marshall was to grow it needed electricity. Early in the year preliminary cost estimates were made for getting power at Marshall. Initially, Montana Power quoted a price of close to \$2000 but stipulated that a right-of-way be cleared from the Green property two and a half miles to the base of the canyon. Mr. Denny agreed to help Mr. Green

cut the right-of-way but had to leave soon after the job was begun. Mr. Green worked much of the summer, neglecting the business of repairing tows to finish the job that year. The power line was not finished until three years after the initial clearing had started. The lack of electric power was a tremendous inconvenience in those three years. There was no phone at Marshall, requiring a three-mile trip up and down the canyon every time a call had to be made.⁷

In an average year the snow depth at the bottom is minimal because of its relatively low elevation. Such conditions require extensive grooming of the lower slopes to insure early skiing with light snow cover. The Greens fell heir to slopes that were covered with rocks and debris requiring considerable time to clean up.

With winter snows soon to come, much work was yet to be done. Mr. Green ran an ad in the Missoulian, "Free skiing in return for a little work." The response was adequate. He stipulated that volunteers would work sixteen hours for an individual membership and twenty-four hours for a family. Many respondents worked more than their required number of hours. Since then, a considerable amount of clearing and grooming has been traded for skiing privileges.

Mr. Green planned to install ten rope tows for the first season, but October arrived and all the motors were still in the garage undergoing repairs. The tows were installed in time for skiing but only two of the ten materialized.

Just when Mr. Green was needed most, the money was getting low, making it necessary to find employment in the city. He took a job in the sugar beet factory for six weeks and has since worked on and off at

⁷Velma Green, unpublished manuscript.

various jobs. Much of the time he has been employed at the Anaconda Company's Bonner Mill to supplement the area's limited income.

In spite of fervent preparations, the first year of skiing was marginal. There was no ski school and only enough business to warrant weekend operations. Two rope tows serviced a small area close to the lodge. The weather brought sporadic snow and very cold temperatures, making skiing conditions less than favorable. For all their efforts the gross income was only \$1200, representing 1500 skier visits.⁸ If Marshall was to become Si Green's dream of Montana's Ski Center, better years had to come.

⁸Ibid.

CHAPTER IV

AREA DEVELOPMENT

Each year new runs have been cut or old ones widened and groomed. New tows have been installed to provide access to more skiing terrain or to relieve the pressure of increasing weekend crowds.

During the second summer Mr. Green built a third rope tow servicing a much steeper slope above the intermediate hill. The tow and its expert run were appropriately named the Challenger. Later he cleared another run on the same face known as the Champion. An additional rope tow was added in 1961 paralleling the Junior tow. It operated when skier traffic on the hill was heavy. These four ropes served until 1963 when another tow was constructed on a more gentle intermediate slope above the Challenger hill.

Originally, gasoline engines taken from junked cars powered the tows. Mr. Green with the help of a welder built all five units and spent considerable time each season gassing, oiling, starting and supervising each one. In cold weather, batteries had to be kept warm at night and installed the next day if the motors were to run.

Mr. Green wasn't satisfied with five ropes. There was still almost a mile of skiable terrain above that could provide intermediate skiing on better snow if there were a way to get up the mountain. Another rope tow didn't seem to be the answer. Rope tows require constant maintenance and are hard to ride up steep slopes. Looking after five ropes was too much work for Mr. Green alone on a busy day.

In 1965 the gas engines were replaced by electric motors that require very little maintenance during the season and can be started from the warmth of the lodge. Four electric rope tows in parallel pairs served the lower slopes. The advent of electrically-powered lifts has cut maintenance expenses and given Mr. Green more time to spend on other details of the operation.⁹

The 1965-66 year was a big one for Marshall. A new 3000 foot long heavy-duty Poma lift was installed and began carrying skiers from the lodge to a point 865 vertical feet up the mountain. The Poma will carry 800 skiers per hour to the top of the Challenger run while the ropes serve an additional 2200 skiers per hour. The new lift opened up acres of terrain, greatly increasing Marshall's capacity and appeal to the skiing public. The new Poma provided access to all existing runs and eliminated the need for the upper two rope tows.¹⁰

The Greens attribute much of the increase in skier traffic at Marshall to the Poma lift. The upper rope tows were difficult to ride, especially for women and young children. The Poma is constructed so that almost anyone can ride it for some distance with ease, even up the steepest slopes. Since the 1965-66 season, runs on both sides of the Poma have been cut and enlarged, increasing the amount of skiable terrain by over three times.

Most of the area served by the Poma lift is excellent intermediate level skiing which has greatest appeal to the average skier, according to the Greens; however, there was the serious problem of getting

⁹Si Green, series of interviews held at Marshall Ski Area, April and May 1969.

¹⁰"Welcome Lift to Ski Area," Missoulain, November 7, 1965, p. 3.

beginning and intermediate skiers off the top trails, since the only way to ski down was over the steep Challenger face, 800 feet above the lodge. Loading ramps were constructed above the Challenger face to permit an intermediate skier, once up the hill, to ski the easier slopes all day without coming down over the steep, expert face at the bottom.¹¹

The first season the Poma operated, many skiers took their skis off and walked down the steep face at the bottom rather than risk a hard fall on the difficult slope. The next summer a switchback trail known as the Ravine run was built, affording timid skiers a path to ski down the last 600 feet without having to navigate the difficult Challenger face. This trail worked well during the 1967-68 season when the snow was good; however, many times the last few hundred feet became iced over, giving the novice skier a wild ride to the bottom, and discouraging many from skiing the upper hill again. Mrs. Green related that an easier trail was built the following summer. It was used during the 1968-69 season with great success. The trail provides a gentle path around the Challenger face without the risk of icing, thus encouraging greater use of the upper slopes by less experienced skiers.

In 1969 a high capacity t-bar lift was constructed above the Poma to service about 3000 feet of almost perfect intermediate skiing terrain. This lift increased Marshall's capacity by 1100 skiers per hour and provides skiing on slopes with more dependable snow conditions.

As the number of tows and lifts has increased, so has the need for more runs. In 1956 only a small area around the lodge had been cleared. New areas that have been expanded were once covered with thick stands

¹¹Si and Velma Green, series of interviews held at Marshall Ski Area, April and May 1969.

of timber, brush and many large rocks. Every summer and fall much volunteer labor and persons working for a season pass have spent long hours helping with and directing clearing operations. Except for logging trucks to carry away the large trees, all clearing has been done with chain saws and small tools. A cat was hired only to expand the parking lot and to carve out the Ravine run.

Although no accurate records of snowpack were kept until the 1967-68 season, the average snow depths have been minimal at Marshall. It is due in part to the warmer temperatures and decreasing snowfall at low elevations. Marshall is only 4020 feet above sea level at the lower lodge and 4870 feet at the top of the Poma. Intensive grooming of all slopes has allowed operations to begin earlier in the season and to continue during periods of warmer weather with melting snow. Grass-covered slopes, free from stumps and rocks, have improved the quality of skiing, especially in poor snow years, according to the Greens. Operations can start on as little as a foot of snow when other ski areas require at least three feet to cover the debris. Mr. Green says he spends much time in the summer mowing the slopes around the lodge and picking up even the smallest pebbles as he goes along.

From a few hundred feet of skiing near the lodge during the first season, clearing and grooming has expanded the skiable area to over three miles. Four runs (Champion, Challenger, Aurora and Red Wing) offer slopes to accommodate the accomplished skier, while the Junior, Intermediate and Ravine runs await the novice. Marshall's longest run, the Challenger, extends nearly 3000 feet, with a vertical drop of 850 feet. Two new slopes parallel to the t-bar lift increased the total vertical drop to 1450 feet and makes an uninterrupted run of over one mile possible.

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CHAPTER V

NIGHT SKIING

Marshall was the only ski area in Montana to offer night skiing on a regular basis during the 1970-71 season. Every night except Sunday tows and lifts operated, providing an opportunity for many Missoulians to ski during the week. According to the Greens, night skiing has special appeal to businessmen who can't get away from work on week days but will take a short drive to Marshall and enjoy skiing from 7 to 10 p.m. under the lights. Many families with school children take advantage of the lighted slopes to ski together without having to contend with weekend crowds. Presently all Marshall's main slopes are lighted except for those adjacent to the t-bar. The lower slopes are illuminated by standard incandescent lights; the Poma runs by twelve 400-watt mercury vapor lamps that were installed in the fall of 1966.¹²

Night skiing began at Marshall during the first season, 1956-57, when the lower slopes were lighted by kerosene flares. The night outings were so popular that season that a gas-powered generator was installed in 1958 lighting the Junior hill several nights weekly. Interest increased. Lights were added to the Intermediate hill, providing expanded skiing every Friday night during the 1959-60 season. Skiing under the lights got a big boost during the 1962-63 season when

¹²'New Lights Attract Night Skiers,' The Missoulian, February 7, 1967, p. 12.

Bob Ward and Sons, a local sports store, sponsored free skiing on Wednesday nights. As many as 350 persons crowded the lower hill during one evening. Wards paid \$25 per night but crowds were so large the second season compared to the revenue, then \$30 per night, the free skiing program was discontinued.¹³

By the 1964-65 season, night skiing had grown so popular that tows were operating four nights a week, Tuesday through Friday. Daytime skier traffic was just enough to support two afternoons each week. Night revenues have continued to grow. During the 1968-69 season all tows and lifts were operating Tuesday through Saturday evenings and day operations numbered seven weekly. A comparison of weekday and night lift revenues for the 1968-69 season shows evenings to be almost twice as popular.¹⁴

Marshall's short season which has averaged about thirteen weeks of operations over the past eleven years has been effectively increased by close to one-third by operating at night.

A survey of skiing in the northwest indicates that midweek attendance is growing rapidly and was thirty percent of total attendance in the 1963-64 season. Projections of forty percent were made for 1976.¹⁵ This trend may have been a reason for increasing revenues for both weekday and night operations at Marshall. The area's close proximity to Missoula, the major market area, is a prime factor in the success of

¹³Hellgate Ski Club, "Area News," Skidaddler (Vol. II, No. 5), March 1963.

¹⁴Marshall Ski Area Log Book, 1968-69, computations made by the author.

¹⁵U.S. Department of Commerce, Economic Development Administration, Skiing Trends and Opportunities in the Western States (Washington, D.C.: Government Printing Office, 1967), p. 11.

night skiing. Getting to Marshall is an easy fifteen minute, seven and a half mile trip from the city limits of Missoula. Five miles of the drive are on a paved highway, and the last two and a half miles are up a gently sloping, well-maintained county road.

It is interesting to note that the Missoula Snow Bowl, Marshall's only competition, tried night skiing three nights weekly in 1966-67. Attendance was very poor while Marshall was sporting capacity crowds. Mrs. Green speculates that Snow Bowl's unsuccessful night operation was due to the difficult drive requiring at least thirty-five minutes from the Missoula city limits.¹⁶

¹⁶Yelma Green, series of interviews conducted at Marshall Ski Area, April and May 1969.

CHAPTER VI

LODGE AND SKI SHOP

Skiing operations have centered around the lodge since the first season in 1956-57. Originally the lodge was a small log structure with a large stone fireplace at one end. Increased business and the addition of a ski shop made expansion of the lodge a necessity. Improvements and expansions were made in 1962, 1964 and 1968.¹⁷

In February 1959, a fire destroyed the Greens' two-story log home including all their personal belongings.¹⁸ They continued to live at Marshall, sleeping in the lodge at night. This tragic misfortune occurred at the peak of the ski season but did not curtail operations. The house was insured for \$10,000, which was paid in full. This money was used to make improvements and to start a new house which was to be connected to the lodge through the kitchen.

The Greens lived in the attic of the lodge the following summers and in a small trailer the next three winters. The new house was started in May 1960 but wasn't completed until four years later. The house was designed so the kitchen could be used to serve skiers in the lodge. This arrangement makes it easy for members of the family to assist in base operations; e.g., selling tickets, serving food and

¹⁷ "Bigger Lodge, Six Nights," The Spokesman Review, December 31, 1964, p. 12.

¹⁸ "Log Home Burns in Ski Area," The Missoulian, February 8, 1959, p. 1.

renting skis. The lodge, now more than double its original size, has a ski school headquarters and ski shop in the south end, with the two-story residence of the Green family on the north end.

The ski shop opened in the basement of the new house during the 1964-65 season. The Greens sold small items such as wax and goggles, but derived a large part of the revenue from ski rentals. Part-time help has been employed to work in the shop, but many busy evenings Mrs. Green can be found in the basement renting a pair of skis, leaving hamburgers to burn on the grill upstairs. Ski shop rentals and sales were only \$611 in 1966 but jumped to \$7800 in 1968-69. Comparative figures can be found on Table III, page 30.

CHAPTER VII

SKI SCHOOL

According to the Greens, ski school operations at Marshall have done much to promote new business and maintain rapport with the skiing public. The ski school did not directly contribute revenue to Marshall's operation until the 1967-68 season, but it has been instrumental in introducing many skiers to Marshall's slopes. Consequently, income from lift ticket sales has increased from the new business.

Before the 1967-68 season, the ski school was the only part of the operation not owned by the Greens. Each year a franchise was given to a director who ran the business on his own. The first ski school was conducted during the 1957-58 season under the direction of Jack Mitchell. Between the 1958-59 and 1963-64 seasons directorship changed hands many times. In 1963 Bill Erickson took charge and managed it four consecutive years. Erickson's extensive promotion attracted many more students than in previous years. During the 1963-64 season, skier visits increased 120 percent over the previous year. Mr. Green feels that much of the increase can be attributed to a well-promoted ski school.¹⁹ The Greens do not know how much the ski school's income was under the directorship of Erickson, but they think it was very profitable.

¹⁹Si Green, series of interviews held at Marshall Ski Area, April and May 1969.

In 1967-68 the Greens incorporated the school into their business and paid the director a wage. That year the ski school added \$7088 to the gross income. During the 1968-69 season they employed thirteen instructors and over 3000 class lessons were given, adding at least \$10,000 to the gross income. In 1970-71 ski school income increased to over \$11,000, contributing about \$6500 towards profits after all expenses. 20

²⁰Max R. Swanson, unpublished financial statements, fiscal years ending May 31, 1968, 1969, 1971.

CHAPTER VIII

PROMOTION AND COMPETITION

After the first few years of operation at Marshall it became evident that there was a general lack of skiing interest in the Missoula area. It would take more than three or four thousand skier visits each year to stay in business. The Greens realized that Marshall needed years of promotion to create a large demand. Each season they have endeavored to increase the area's appeal by improving and expanding facilities.

In the fall, letters and pamphlets have been sent out advertising any new developments, and schedules were printed for the coming season. Early sales of discounted season passes have helped create interest. Ski school programs have been promoted far in advance of winter snows. During the season radio and newspaper advertising inform the public of current snow conditions and operating schedules. Many hours are spent on the phone answering questions of anxious skiers.

Every effort has been made to create a congenial atmosphere. Many days movies have been shown in the lodge when poor snow or rainy weather has ruined skiing. Separate ski school programs for ladies, businessmen, high school and college students have been instituted. Baby sitting services and a youngster's ski school are provided for the children of skiing housewives. Lift rates have been kept as low as possible.

Much effort has been put into the promotion of Marshall's night skiing. The Wednesday night program of free skiing during the 1962-63

and 1963-64 seasons introduced many to the thrills of skiing under the lights. As a result, skiing at night has become more popular than weekdays.²¹

The Greens do not feel that the local competition, Missoula Snow Bowl, has been detrimental to their business but has actually helped to increase it. The Snow Bowl has used intensive advertising that has stimulated a general interest in skiing locally.²² Marshall and Snow Bowl differ radically in skiing terrain. Snow Bowl is reputed to be an expert area and caters to the more advanced skier. Marshall's gentle slopes attract more novice and intermediate crowds. It also seems to have greater appeal to families who enjoy skiing together. The Greens have attempted to encourage family groups by giving reduced rates on family season passes.

²¹ See Chapter V, Night Skiing.

²² Velma Green, series of interviews conducted at Marshall Ski Area, April and May 1969.

CHAPTER IX

OPERATIONS AND FINANCES

Thirteen years have passed since the Greens started operations at Marshall, running two rope tows three days a week. They have endured many seasons of poor snow, small crowds, frequent repairs and low income. Often a full day grossed only a few dollars. During the third season a fire destroyed their log home but Marshall operated the next day and continued to the spring melt. Each year Mr. Green has worked in Missoula to supplement Marshall's lagging income and in the fall the sale of season passes financed last-minute improvements.

In spite of numerous setbacks and marginal income, Marshall has grown steadily each year in both facilities and popularity. Marshall now has two 3000-foot long cable lifts, miles of groomed trails and strings of bright lights providing skiing seven days and five nights each week. The average number of skiers visiting Marshall per season has increased over five times since the early years. Gross income has steadily increased. Total revenue during the 1968-69 season amounted to \$64,000, leaving \$20,000 profit.

Except for the 1968-69 season, Marshall's net income has been marginal in spite of increasing skier visits and larger gross revenues. Net income averaged only \$1500 for the first twelve years of operations and \$6500 for the last five; however, if compared to the local competition, Missoula Snow Bowl, Marshall has done well considering its small yearly profit. The Missoula Snow Bowl has operated in the red

since 1962 and acquired a large backlog of overdue financial obligations. Statements presented at a Snow Bowl stockholders meeting in 1967 revealed many unpaid bills and taxes. The income statement for that year showed a net loss of more than \$22,000. Losses have been incurred each year even though gross revenue and skier visits have tripled since 1962.²³

How has Marshall managed to remain profitable while its main competition has slowly slipped to the edge of bankruptcy? The Greens have made a conscious effort to keep all costs as low as possible. Mr. Green has done much of the rope tow building and trail clearing himself. Friends and relatives have donated many hours of labor, preparing facilities for the winter snow. Whenever possible work has been traded for season passes or daily lift privileges. During the ski season members of the family work, without pay, at everything from selling tickets to loading lifts. Total wage expenses for each year have been less than twenty-five percent of the gross revenue. During the 1966-67 season wage costs were only fifteen percent of total income.

Installation of reliable electric tow motors and efficient mercury vapor lights has cut down on maintenance and utility costs. A dependable Poma lift replaced two gas-powered rope tows that required constant attention and frequent repairs.

The interest burden has been kept at a minimum. Improvements have been gradual, keeping pace with anticipated demand. Until 1965, all construction and improvements were financed by personal savings and current revenue. Only the original purchase of the property required borrowed funds. In 1965, a S.B.A. loan for \$36,000 financed the Poma lift, lodge improvements and lights for night skiing. In 1969 a second

²³Condensed Balance Sheet, Missoula Snow Bowl Ski Area, April 30, 1967.

loan for \$52,700 was secured to finance the upper t-bar and a slope-grooming tractor. The Greens felt that these loans were small in terms of the revenue increases these improved facilities were expected to bring. Every effort was made to limit the purchase price and installation cost of the new lifts. Mercury vapor lights, requiring a much higher initial investment than the incandescent type, more than compensated in reduced operating costs.

Figures in Tables I and II on the following pages show number of skier visits, gross income, net profit, length of season, possible and actual operations for the thirteen years from 1958 through 1971.²⁴ Analysis and comparison of these figures help to explain some important interrelationships affecting overall growth and profits, and reveals some basic problems peculiar to Marshall. A look at how the Greens have made the best of these problems is important to the understanding of Marshall's evolution as a profitable business enterprise.

Although some data were not available, many valid and useful conclusions can be made. To facilitate comparison, the thirteen years are divided into two periods, because the addition of the Poma and t-bar lifts in 1965 and 1969 changed the lift rates, uphill lift capacity, cost structure and overall appeal to the skiing public, as compared to operations with rope tows only.

The first period includes the years between 1958-59 and 1964-65. The adult lift rate for all tows was two dollars for a day pass and one

²⁴An "operation" is defined as one day or night that the lifts are run. Days and nights are separate operations. Based on past records and short run expectations of skier traffic, the Greens have attempted to design a weekly operations schedule for each year so that on the average there would be enough skiers attending each day to cover operating costs. The schedule, once established and advertised for that year, was followed closely when weather and snow conditions would permit.

dollar at night. All tows were the rope type and skiable area was limited. The second period includes the six years between 1965-66 and 1970-71. A Poma lift, installed in 1965 and a t-bar constructed in 1969, greatly increased Marshall's uphill transportation capacity and opened up miles of new terrain. Adult lift passes increased to three dollars daily and two dollars at night. The new facilities increased depreciation costs and interest charges on the loans added to overall expenses.

TABLE I

MARSHALL SKI AREA--COMPARISON OF SEASON LENGTH AND SKIER VISITS WITH REVENUES AND PROFITS FOR THE SEASONS 1958-59 THROUGH 1964-65a

Income			Seasonal Data		Operations		
Season	Gross All Sources	Net Profit	No. of Skier Visits	Season In Weeks	No. Wkly. Sched. Oper.	No. Possible Good Snow All Season	Actual Season Total
1958-59	\$ 2,530	\$ 394	2,500	7	3	21	16
1959-60	3,190	(510)	3,000	8	3	24	N.A. ^b
1960-61	4,262	(91)	4,000	12	3	36	N.A.
1961-62	7,219	673	6,000	16	4	64	N.A.
1962-63	7,104	856	6,000	10 ^c	5	50	38
1963-64	15,571	3,937	13,247	15 ^d	8	120	103
1964-65	20,108	5,186	12,697	17 ^e	9	153	104

^aCollected from: Marshall Ski Area log books and tax records--1958-59 through 1964-65.

^bData on total number of operations was not recorded for those years.

^cNo skiing until late January.

^dFree skiing on Wednesday night.

^eSix weeks of very poor snow.

TABLE II

MARSHALL SKI AREA--COMPARISON OF SEASON LENGTH AND SKIER VISITS WITH
REVENUES AND PROFITS FOR THE SEASONS 1965-66 THROUGH 1970-71^a

Income			Seasonal Data		Operations		
Season	Gross All Sources	Net Profit	No. of Skier Visits	Season In Weeks	No. Wkly. Sched. Oper.	No. Possible Good Snow All Season	Actual Season Total
1965-66	\$20,010	\$ 305	12,700	12	11	132	108
1966-67	24,096	425	13,000	13	11	143	115
1967-68	34,727	5,115	12,100	12	11	132	88
1968-69	64,697	21,318	30,000	15	12	180	155
1969-70	51,334	3,924	17,000	13	12	156	91
1970-71	54,514	1,661	17,000	14	12	168	80

^aCollected from: Marshall Ski Area log books and tax records, 1965-66 through 1970-71.

A look at the figures for the first five seasons will help to outline some of the inherent problems that the Greens have faced at Marshall.

The most crucial problem--inadequate snow--has already been mentioned. The amount of snow and duration of winter weather directly determine the length of the ski season. The number of weekly operations is also partly dependent upon prevailing snow conditions. Late snow during the 1958-59 year allowed only seven weeks of skiing. The schedule that year was three operations weekly, permitting a total of twenty-one operations for seven weeks; however, poor conditions allowed only sixteen of the possible twenty-one. About 2500 skiers attended that year, spending a total of \$2530. Net profit was \$394. In addition to limiting the length of season and gross revenue, poor snow and variable

weather conditions have created other problems, according to Mr. Green. Although costs are not increased per se, considerable time is spent telephoning radio stations, newspapers and sports stores to inform them about changes in the operating schedule. Many hours are spent answering calls from anxious skiers who want to know when the lifts will be open and the condition of the snow. Those attending regular ski school who have missed sessions because of weather must be informed about refunds or makeup times. When the skiing conditions improve after a short period of limited or poor snow, considerable advertising effort is necessary to convince skiers that the season is not over.²⁵

The 1959-60 and 1960-61 seasons showed small increases in skier traffic and gross revenue but losses were incurred both years: \$510 and \$91, respectively. Not enough data are available to make a significant comparison.

About 6000 skiers attended Marshall during each of the 1961-62 and 1962-63 seasons, spending just over \$7000 each year. Profits, however, were only \$673 in 1961-62 and \$856 in 1962-63. The 1962-63 season, while four weeks shorter than the previous year, attracted as many skiers; but in spite of the steady increase in popularity Marshall failed to show much improvement in profitability. Although exact calculations had not been made the Greens estimated that enough skiers had attended most days to more than cover daily operating expenses, but revenues in some of the shorter seasons had not been sufficient to cover all fixed expenses resulting in small losses.

In an attempt to increase profits the slopes had been groomed to facilitate use of every inch of snow that fell and all costs

²⁵Velma Green, series of interviews conducted at Marshall Ski Area, April and May 1969.

had been kept to a minimum but after several poor years it became evident that profits could best be improved by increasing the total number of skier visits each year and/or increasing the revenues per skier visit.

The 1963-64 season was an important one in Marshall's history. During the fifteen-week season over 13,000 persons skied at Marshall, double the number in any previous year. Gross income increased to \$15,571 and net profit was almost \$4000. A number of reasons for this growth are worth considering.

Consistently good snow allowed a maximum number of scheduled operations, and fifteen weeks of good skiing. Weekly operations were increased to eight, compared to five the previous year. Out of a possible 120 operations for the fifteen weeks, 103 were completed. Though this figure is much larger than the total of thirty-eight operations during the 1962-63 season, it should be noted that the increase in number of operations weekly and for the season does not fully account for the large jump in skier visits. Mr. Green attributes a large part of the increase to highly successful promotional efforts of ski school director Bill Erickson and his assistant, Cliff Blake. This was the first season that Marshall had a well-organized and advertised ski school. Another factor influencing the increase was the growing popularity of night skiing promoted, in part, by Bob Ward's free skiing every Wednesday.²⁶

²⁶ See Chapter V, Night Skiing.

Profits rose again in the 1964-65 season, but the total number of skier visits dropped by 650 from the previous season. The gross revenue was \$20,018, about \$4500 more than the 1963-64 season. In an attempt to increase the revenue per skier visit a ski shop was added, specializing in rental equipment. That year it contributed over \$1700 to the gross revenue. During the same season \$3700 of the gross revenue came from the sale of food in the lodge, an increase of \$500 over the previous year.

TABLE III

MARSHALL SKI AREA--INCOME AND PERCENTAGE TO TOTAL FOR
YEARS 1962-63 THROUGH 1970-71 BY SOURCE^a

Season	Cafeteria	Ski Shop	Ski Lifts	Ski School	Total
1962-63	N.A.	None	N.A.	None	\$ 7,104 100%
1963-64	\$3,209 21%	None	\$12,364 79%	None	15,574 100%
1964-65	3,715 19%	\$1,712 8%	14,591 73%	None	20,018 100%
1965-66	4,837 24%	611 3%	14,570 73%	None	20,018 100%
1966-67	4,236 17%	1,130 5%	18,730 78%	None	24,096 100%
1967-68	4,164 12%	3,764 11%	19,711 57%	\$ 7,088 20%	34,727 100%
1968-69	5,700 9%	7,800 12%	40,300 63%	10,200 16%	64,000 100%
1969-70	4,328 8%	6,143 12%	33,669 66%	6,936 14%	51,076 100%
1970-71	5,314 10%	6,168 12%	31,100 59%	11,561 22%	54,143 100%

^aCollected from: Marshall Ski Area tax records and income statements, 1962-63 through 1970-71.

Since 1964-65 the ski shop has continued to add to the overall revenue, contributing \$7800 during the 1968-69 season, yet revenue from the ski shop and lodge operations account for only \$2200 of the \$4500 increase in gross over the 1963-64 season. The Greens speculate that the remainder might be attributed to a higher proportion of adult tickets sold at two dollars in comparison to one dollar and fifty

cents charged for juniors. Fewer season ticket holders (who are counted as a skier visit, but do not pay each time) may have attended that year. No records were available for the number of season ticket holders that year.

The 1965-66 season brought some radical changes to Marshall. Installation of a Poma lift marked the beginning of this second period of development. The need to finance the Poma led not only to an increase in lift rates but also significantly altered Marshall's fixed cost structure. Prior to 1966 there had been no interest charge. The income statement for the fiscal year ended May 31, 1967, shows an interest charge of \$2236 on the \$36,000 loan taken in 1965. Depreciation charges on the Poma added \$3000 to yearly expenses. These additional charges required an increase of gross revenue from lifts of at least \$5000 if the previous level of profit was to be maintained.

The Greens projected expected revenue from all sources during a full fifteen-week season with good snow and eleven operations each week. The new lift was expected to increase skier traffic to 30,000 visits, resulting in gross revenue of \$60,000 and profit margin of \$23,000.

The 1965-66 season did not bring the expected increases. Poor snow limited the season to twelve weeks and 108 operations. Gross revenue was only \$20,010 from 12,700 skier visits. The Poma lift did not begin operating until the middle of February, limiting revenue from lifts to \$14,570, a few dollars less than the previous year. Increased interest and depreciation expenses cut profits to a low of \$305.

Below average snow during the 1966-67 year held the season to thirteen weeks and 115 operations. The Poma operated the full thirteen weeks, increasing lift revenues \$4000 over the previous year. Total

revenues of \$24,096 were realized from 13,000 skier visits. Depreciation allowance on the Poma increased this expense by almost \$3000, holding the profit to \$425.

Mrs. Green says that the twelve week, 1967-68 season was one of the poorest snow years she can remember. Constantly changing weather and snow conditions allowed only 88 of the 132 possible operations. The ski school had to cancel all lessons for more than a week during one particularly bad period. Marshall's increasing popularity must be assumed to have been primarily responsible for the 12,100 skier visits during this season of marginal skiing conditions. A comparison of the number of skier visits per operation for 1967-68 and 1964-65 shows a 14 percent increase over the three-year period. Total revenue rose by \$10,600 over the 1966-67 season, amounting to \$34,727 from all sources. Ski shop and lift revenue accounted for \$3600 of the increase; the remaining \$7000 was income from the ski school. (In previous years the ski school was a separate business operation from which no revenue was derived. The Greens, in their attempt to create as many sources of profit as seemed feasible, had incorporated the ski school into the business. Although wages paid to instructors were over \$3000, the extra revenue added \$4000 to profits.)²⁷

It was not until the 1968-69 season that conditions were similar to the kind of season the Greens projected in 1965 when they formulated the income for a fifteen-week season of good snow, utilizing a Poma as the main lift. Snow came early in December and remained until the middle of March. The Greens operated 155 times out of a possible 180. Total skier visits more than doubled any previous year. These 30,000 skier visits were precisely the number predicted by the Greens in 1965.

²⁷See Table III, page 30.

Revenue from lifts alone was \$40,300. The ski shop, cafeteria and ski school added another \$23,700 for a total of \$64,000 gross. A profit of \$20,000 was considerably higher than all the previous years combined.

The 1969-70 season was very disappointing. The new t-bar lift above the Poma was ready for operation by November and was expected to attract many more skiers than in previous years and to provide good skiing when the snow was poor on the lower slopes; however, the extremely marginal snow conditions that prevailed through the short thirteen weeks allowed only 91 operations and reduced the total number of skier visits to 17,000, about 13,000 less than in the previous year. Although total incomes were over \$51,000, increased interest and depreciation charges on the t-bar lift held profits to just under \$4000.

Very poor snow conditions prevailed again during the 1970-71 season, permitting only one or two days of operations many weeks during the year. Though skier visits were the same (17,000) as in the previous year, Marshall was able to operate less--only 80 times. While increases in the number of skier visits and incomes per operation resulted in a total income figure of \$54,514, a sharp increase in labor expenses coupled with the new interest and depreciation charges cut profits to \$1661.²⁸

It was hoped that the t-bar lift above the Poma would eliminate many of the problems Marshall has encountered in years of marginal snow conditions. The slopes adjacent to the t-bar are higher in elevation and generally have had much better snow conditions than the slopes on the Poma hill and lower beginners area, however, during some

²⁸Comparative cost and revenue data is presented in Part II, Table VIII, page 60.

periods of very poor snow the Poma has been almost unskiable, making it very difficult for customers to get off the mountain from the upper slopes. In addition the present lighting system--extending as it does only to the top of the Poma lift--has eliminated the possibility of using the t-bar area for night skiing.

The new lift has been effective in reducing lift lines on the Poma during periods of good snow and heavy traffic and has almost doubled Marshall's skiable area. Yet, strong as these advantages would seem to be, it is evident that Marshall still remains dependent on the weather to provide adequate snows to allow longer seasons that are necessary if a good profit is to be realized.

A balance sheet and income statement prepared May 21, 1970, shows Marshall's financial condition at the end of the 1969-70 season.²⁹ Total current and fixed assets have increased from less than \$10,000 in 1956 to over \$97,500 after depreciation in 1970. Though total liabilities are slightly more than \$21,000, resulting in an equity of \$21,238.20, this statement does not reveal the actual value of the present investments. Neither the appreciated value of the land nor the considerable value of the good will Marshall has gained over the years have been accounted for.

²⁹See Exhibit I and II on the following pages. No balance sheet had been prepared for the 1970-71 season at this time.

EXHIBIT I

MARSHALL SKI AREA
Missoula, MontanaSTATEMENT OF FINANCIAL CONDITION
Prepared from records without audit
May 31, 1970ASSETS

Current Assets:

Cash in bank	\$ 1,828.79	
Certificates of deposit	21,055.19	
Interest receivable	307.00	
Inventory, merchandise and food	<u>1,797.00</u>	
Total current assets		\$24,987.98

Fixed Assets:

Buildings and improvements	\$ 13,275.06	
Tows and runs	89,583.15	
Fixtures and equipment	5,514.76	
Mobile equipment	<u>11,453.35</u>	
	\$119,826.32	
Less--Allowance for depreciation	<u>47,414.67</u>	72,411.65

M. R. C. License

150.00
\$97,549.63

LIABILITIES AND NET WORTH

Current Liabilities:

Accounts payable	\$ 6,434.27	
State withholding tax payable	13.04	
Accrued property taxes	137.50	
SBA loans	10,950.00	
Denny escrow (current portion)	200.00	
Contract payable--mobile equipment	<u>3,500.00</u>	
Total current liabilities		\$21,234.81

Fixed Liabilities:

SBA loans (non-current portion)	\$ 47,228.08	
Denny escrow (non-current portion)	<u>7,848.54</u>	55,076.62

Net Worth:

Investment, John A. and Velma Green	\$ 5,665.64	
Additional investment	22,000.00	
Net profit	<u>3,924.00</u>	
	\$ 31,615.64	

Less--Drawings consisting of:

Federal income tax payments	\$5,928.70	
State income tax payments	1,593.62	
Personal	<u>3,746.36</u>	11,268.66
		<u>21,238.20</u>

Source: Max R. Swanson, "Financial Statements"
Fiscal year ended May 31, 1970.

\$97,549.63

EXHIBIT II

MARSHALL SKI AREA
Missoula, MontanaINCOME STATEMENTPrepared from records without audit
For the Fiscal Year Ended May 31, 1970

Income:

Sales: Merchandise	\$ 6,142.59
Food	<u>4,328.28</u>
	\$10,470.87

Cost of Sales:

Inventory, beginning	\$ 513.19	
Purchases, merchandise	4,918.40	
Purchases, food	<u>1,726.81</u>	
	\$7,158.40	
Inventory, ending	<u>1,797.00</u>	<u>5,361.40</u>
Gross profit, sale of merchandise and food		\$ 5,109.47

Sales: Season tickets	5,087.07
Tow fees	28,581.71
Ski school	6,936.35
Miscellaneous income	<u>257.84</u>

<u>Gross profit</u>	\$45,972.44
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Expenses:

Wages	\$10,186.02	
Payroll taxes	525.36	
Accounting and legal	395.00	
Advertising	1,522.02	
Automotive expenses	511.38	
Contributions	398.25	
Depreciation	14,568.60	
Dues and subscriptions	140.00	
Electricity, fuel and water	2,053.28	
Insurance	3,603.96	
Interest	2,581.69	
Repairs and maintenance	1,767.67	
Supplies	1,390.32	
Taxes and licenses	421.39	
Telephone	274.72	
Travel and entertainment	589.62	
Land lease	706.25	
Merchandise stolen	259.70	
Miscellaneous	<u>412.41</u>	<u>42,275.38</u>

Net operating profit	\$ <u>3,924.00</u>
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Source: Max R. Swanson, "Financial Statements", Fiscal year ended May 31, 1970.

PART II

HISTORY APPLIED TO THE FUTURE: THE FEASIBILITY
OF SNOWMAKING AT MARSHALL

CHAPTER X

AREA POTENTIAL

Industry Comparisons

The long awaited "Case Study" on the economic status of United States ski areas was released at the 1970 meeting of the National Ski Areas Association. This summary report was prepared for owners, investors and managers. It covers the key findings, recommendations for improvement, and statistical profiles of the responding areas.

Instead of dividing the areas according to their gross fixed assets as was the custom in the past, areas were divided into top, middle, and bottom thirds based on their profitability, as measured by returns on GFA. Regional breakdowns dividing ski areas into East, Midwest, Rocky Mountain and Far West groupings provide valuable data for comparison.

The first report states that skiing is a risky business in which it is difficult to make a profit. Only 45 of the 105 respondents to the questionnaire were profitable. Of the 40 areas in the Rocky Mountains, only 35 percent were profitable.³⁰ Table IV compares Marshall's profit performance to that of the average profitable area in the Rockies. In three of the four seasons between 1967-68 and 1970-71, Marshall was well

³⁰Case and Company, Inc., Economic Report for National Ski Areas Association (New York, N.Y., 1970), pp. 1-10.

below the 19.3 percent before-tax profit level of the average profitable area in the Rockies studied during the 1967-68 season; however, the 1968-69 season showed a return well above the average profitable area, due to favorable snow conditions that allowed a full fifteen weeks of almost continuous operations using cable type lifts.

The 1968-69 season suggests that Marshall can make a substantial profit compared to other ski areas in the Rocky Mountain region if weather conditions permit good skiing conditions for at least fifteen weeks of operations.

TABLE IV

COMPARATIVE PERCENTAGE RETURNS ON GFA AND RELATED DATA
FOR THE AVERAGE PROFITABLE AREA IN THE
ROCKIES COMPARED TO MARSHALL SKI AREA

Average Profitable Area in the Rockies ^a					
Season	\$GFA	Profit Before Income Tax	Percent Profit to GFA	Length of Season in Weeks	Total No. of Operations
1967-1968	\$885,000	\$87,600	19.3%	N.A.	N.A.
Marshall Ski Area ^b					
1967-1968	\$ 59,520	\$ 5,115	8.5%	12	88
1968-1969	63,656	21,318	30.0%	15	155
1969-1970	119,826	4,479	3.7%	13	91
1970-1971	120,000	3,867	3.2%	14	80

^aCase and Company, Inc., Economic Report for National Ski Areas Association (New York, N.Y., 1970), p. 45.

^bMarshall Ski Area, Income Statement and Balance Sheet, 1967-68 to 1970-71.

Snow Problems

Most ski areas have a high investment in fixed assets, thus requiring a large margin over variable costs to cover fixed capital expenses such as property taxes, licenses, rent, depreciation and interest. Assuming that revenues from operations are adequate to cover all variable and semi-variable costs, a profit can be realized only if a ski area is able to operate enough days and/or nights each year to cover their fixed costs. The level of profits is largely dependent on the number of operations each season and revenues collected per operation.³¹

Table V shows that Marshall's total revenues per operation have exceeded total operating costs per operation each season since the installation of cable type lifts in 1966. Table V also indicates that Marshall is growing in popularity, represented by an increase in total skier visits per operation. Since lift prices have remained the same for the past five years, increases in dollar revenues per operation are largely due to the increasing number of skier visits per operation. Even so, the "Case Study" established the fact that the top third of the profitable areas responding averaged 119 days, or about fifteen weeks of operation. A fifteen week season, then, would appear to be a practicable goal for Marshall. The two most profitable areas studied, averaged 144 days per season and those in the top third averaged 119 days or about 15 weeks.³²

³¹Theodore A. Farwell, Jr., "Land Values and the Ski Area Forest Service Proposal," Skiing Area News, October 1967, p. 40.

³²Case and Company, Inc., p. 3.

TABLE V

COMPARATIVE REVENUE AND COST DATA FOR MARSHALL SKI
AREA FROM 1966-67 TO 1970-71

Season	1966-67	1967-68	1968-69	1969-70	1970-71
Length of season in weeks	13	12	15	13	14
No. of operations	115	88	155	91	80
No. of skier visits	13,000	12,000	30,000	17,000	17,000
Skier visits per operation	113	138	193	187	212
Total revenue	\$24,890	\$34,724	\$64,697	\$51,334	\$54,819
Revenue per operation ^a	\$216	\$394	\$416	\$564	\$685
Total operating costs	\$13,632	\$20,453	\$34,001	\$28,607	\$32,212
Operating costs per operation ^b	\$118	\$233	\$226	\$314	\$400

Source: Marshall Ski Area, Income Statements and Log Books of Operations, 1966-67 to 1970-71.

^aThis figure is calculated by dividing the total annual revenue by the total number of operations that season.

^bThis figure is calculated by dividing the total annual operating costs by the total number of operations that season.

Although efforts have been made to improve Marshall's overall success, it can be said that the profit picture in the past has depended largely on general weather conditions and the snowfall each season. Marshall's low elevation and the prevailing weather patterns in the Missoula area combine to make the snow conditions undependable.

Review of Marshall's history shows that only 2 out of 15 seasons have had snow conditions allowing operations to approach 15 weeks of continuous operations with good skiing conditions. Many seasons have had approximately 15 weeks of operations, but usually with much variable weather and poor snow allowing only one or two operations per week for as much as half the season. According to Mrs. Green, in some years early snowfalls have permitted good skiing by the first week in December, but often the snow is followed by a warm rain leaving the slopes unskiable. Many times during past seasons good snowfalls have been followed by several days of warm weather, causing the snow to become wet and heavy. Warm weather is often followed by a prolonged period of very cold weather and no new snow causing severe icing that makes skiing very dangerous.³³ Weather studies conducted at many ski areas across the country have shown a pattern of snow storms followed by thaws and rainfalls, capped by freezing weather and long periods of no precipitation. Even with mountains having a deep base of natural snow, the results can be weeks of ice too hard to drag or even chop. The study also points out that few areas can be sure of enough natural snow for the Christmas period.³⁴

A Narrative Climatological summary published by the weather bureau for Missoula shows that variable weather conditions are common in the Missoula area and directly affect the skiing conditions at Marshall. It states in brief:

³³Si and Velma Green, series of interviews conducted at Marshall Ski Area, May and June 1971.

³⁴"The Economics of Snowmaking," Ski Area Management, Summer, 1966, p. 10.

"During the winter season the Continental Divide shields the Missoula area from much frigid arctic air. Many of the cold waves that sweep over Montana miss the Missoula area entirely because of this shielding effect. Under certain conditions, however, the frigid air does flow across the Continental Divide, filling the small mountain valleys. When this happens periods of prolonged cold weather persist. Normally January is a rather cold month, although periods of sub-zero weather occur occasionally in December and February."³⁵

The summary goes on to point out that Missoula receives only an average of 12 to 15 inches of precipitation annually, which classifies it as semi-arid. Data on snowfall show that totals have been as high as 82 inches in one season but vary widely from year to year.

In the period between 1900 and 1970 Missoula's total yearly snowfall has been recorded as below 41 inches for 40 of the 70 years. Twenty winters had less than 30 inches of snowfall and several below 20 inches. Although no accurate records of snowfalls have been kept at Marshall, the amounts received vary widely from year to year as they do in Missoula. Comparative weather data shows that since the Greens took over operations in 1958 Missoula has received snowfalls in excess of 41 inches each winter, yet only two were considered good snow years at Marshall.³⁶

If weather patterns and seasonal snowfalls continue to vary as they have in the past, Marshall can expect winters with skiing even poorer than some they have already experienced. Two or three years of very poor snow would seriously hurt Marshall's financial condition and public image.

In 1968 the Greens were considering several alternatives to cope with the inherent snow problem at Marshall. One idea was to move the

³⁵U.S. Department of Commerce, Local Climatological Data for Missoula, Montana (Washington, D.C.: Government Printing Office, 1971), p. 4.

³⁶Ibid., p. 4.

base operations further up the mountain to take full advantage of the more reliable snow conditions at higher elevations. This would have required building a new lodge, rerouting the access road and moving tows up the mountain. The tremendous effort and expense involved in this proposed change was more than the Greens were willing to undertake. A second possibility would have been to install commercial snowmaking equipment that could cover Marshall's slopes with excellent snow whenever "Mother Nature" failed to do her job. In 1966 some 350 ski areas throughout the world with snow problems similar to Marshall were using snowmaking equipment to improve their skiing conditions.³⁷ The use of snowmaking equipment has created good conditions in many areas of the country where skiing was considered impossible because of limited natural snowfall.

Until 1968 all snowmaking systems were built by Larchmount Engineering using equipment that mixed high pressure air and water in a nozzle producing quantities of snow at temperatures below freezing; however, these systems require large compressors to provide the necessary quantities of high pressure air. The estimated cost to install one of Larchmount's systems large enough to cover 20 to 30 acres of Marshall's lower slopes was close to \$400,000. In addition to the installation price, operational costs were estimated at as much as \$2300 each week.³⁸ The extreme cost of installing and operating the Larchmount equipment compared to the economic benefits ruled out the possibility of snowmaking at the time.

The third and most feasible alternative would have been the

³⁷"The Economics of Snowmaking," Ski Area Management, Summer 1966, p. 4.

³⁸"Special Report on Snowmaking," Ski Area Management, Spring 1965, pp. 1-3.

construction of a new lift above the Poma. Because this lift would be almost 1000 feet higher in elevation, the Greens speculated that the slopes would be covered with adequate snow much earlier and longer than the lower trails. If snow were poor on the lower slopes, skiers could ride the Poma to the new lift and ski the upper slopes all day. The Greens felt that the cost of the new lift, about \$50,000, was reasonable. It would provide some measure of insurance against a poor snow year, increase total lift capacity and provide access to many acres of excellent terrain suited to skiers of all abilities.

The decision was made and the lift was completed in time for the 1969-70 season. It has been used with great success for the last two years; however, it has not solved the snow problem. The last two winters were very poor. Lower slopes had marginal snow and many periods of unskiable ice during the short thirteen and fourteen week seasons. The snow on the new t-bar was generally good for the 1969-70 and 1970-71 seasons, but many skiers were discouraged by the poor snow on the lower slopes which they had to ski across to get off the mountain.³⁹ The t-bar could not be utilized for night skiing because the present lighting system extends only to the top of the Poma lift. Operations for the 1969-70 and 1970-71 seasons were limited to 91 and 80 respectively and skier visits for both years were a low 17,000.

³⁹Si and Velma Green, interviews conducted at Marshall Ski Area, May and June 1971.

CHAPTER XI

POTENTIAL OF SNOWMAKING

Industry Experience

Not long ago skiing was strictly a "nature-controlled" sport. Ski areas could make or lose millions of dollars at "Mother Nature's" whims. Even winters with average snowfall could be financial disasters to ski areas if freezing rain fell frequently. Today ski area operators can do something about the weather by making their own snow.

About 350 ski areas throughout the world were using snowmaking equipment during the 1969-70 season. Most of these areas were using the compressed air and water process to make snow, but some airless systems have been used in the past two years with considerable success.

Snowmaking is a necessity from Massachusetts southward, but some northern areas also benefit from snowmaking. Even areas in the natural snow belts are dependent on snowmaking for a successful season. These operators feel that snowmaking is "insurance," protecting their investment in lodges, lifts and related facilities.⁴⁰

The Christmas holiday period accounts for as much as one-fourth to one-third of the season's total income at many areas, yet few areas can be sure of enough natural snow for the holiday period. Even though areas may have adequate snow cover, sudden changes in the weather can create conditions unfavorable for skiing. Areas using snowmaking have almost

⁴⁰John Hitchcock, "Insuring Insurability," Ski Area Management, Summer 1966, p. 34.

eliminated these problems. Present equipment can produce a powder surface overnight so that conditions can go from almost unskiable to excellent with a resulting upsurge in patronage and income.⁴¹

Many ski areas have lengthened their season as much as four weeks. Mt. Tom, a small Massachusetts ski area, would probably operate less than thirty days most winters, but it has stretched its season to over eighty days with snowmaking equipment.⁴²

The "Case Study" notes that of the 35 areas ranked in the top third, with operating profits ranging between 10.5 and 44.8 percent of GFA, 11 were using some type of snowmaking equipment to supplement natural snow. John A. Auran analyzed the factors presented in the "Case Study" that affect ski area profitability. He states that,

"Subject to qualification, nearby competition, promotion and ticket prices are not major causative factors. True, fewer rivals, more promotion, and higher tickets might help an area in the lower category, but the study makes plain, this is not absolutely essential to profitable operation. Snowmaking and length of season are critical factors at many resorts and may be important if an area is to break into the top third of those showing a profit."⁴³

New Developments in Snowmaking

Years of experience at Marshall have proven that in spite of the Green's effort to build a successful and profitable business there is no substitute for dependable snow conditions. Commercial snowmaking equipment has been available for the past ten years that could greatly

⁴¹"The Economics of Snowmaking," Ski Area Management, Summer 1966, p. 38.

⁴²"Special Report on Snowmaking," Ski Area Management, Summer 1966, pp. 3-4.

⁴³John A. Auran, "What the Case Study Means to You," Skiing Area News, Summer 1970, p. 33. Italics added.

improve overall snow conditions and insure at least 15 weeks of good skiing each year. The problem has been that the tremendous cost of installing and operating this equipment has restricted its use to ski areas close to population centers that gross well over \$200,000 each season.⁴⁴

Finally--during the past two years--new developments in snow-making have drastically changed the picture. Professor Goesta Wollin, an oceanographer from Columbia University, has developed a new process of making snow that does away with the use of expensive air compressors; the developers have estimated that it will reduce the cost of snowmaking by about 75 percent.⁴⁵

The basic principle of the Wollin machine involves the atomization of water by a high-speed, Teflon-coated multi-blade fan powered by a seven and one-half horsepower electric motor. Water is fed through a small orifice onto the rotating blades. The leading edge of the blade picks up a portion of the water and centrifugal force causes the water to be thrown off the trailing edge of the blade in atomized form. Snow is produced through evaporant cooling. Water is supplied to the unit from pipes by a garden hose at tap water pressure.⁴⁶

Preliminary tests of the Wollin machine have shown it to be as effective in producing skiable snow as the conventional compressed air nozzle system. The new system was tested in a climatic chamber at the Eglin Air Force Base in Florida. The machine ran for 500 hours and made

⁴⁴Mike Maginn, "Snowmaking in Transition," Skiing Area News, Fall 1970, p. 37.

⁴⁵Ibid., p. 37.

⁴⁶Goesta A. Wollin, "A New Method of Snowmaking," Weatherwise, October 1970, p. 228.

snow under ambient temperatures from 28 degrees to -65 degrees. Two units made a snow hill 25 feet high in the first two days of testing. An on-the-hill test conducted at Jay Peak, Vermont, proved very successful in spite of temperatures that were considered too warm for good snowmaking.

This new system is being manufactured on a limited scale by Snow Machines International of Tuxedo, New York. Preliminary tests at several areas in the East and Midwest during the 1970-71 season showed that the systems are economically and operationally practical and may revolutionize the whole field of snowmaking.⁴⁷

The comparatively low costs of installing and operating the Wollin airless machine make snowmaking economically feasible for many areas that previously could not justify installing the expensive air-water systems.⁴⁸ This new development in the snowmaking industry merits consideration by Marshall Ski Area as a solution to their inherent snow problems.

Technical Considerations

There are certain technical and physical requirements that determine whether or not snow can be made effectively. The most important of these is an adequate water supply, although temperature and humidity are also important considerations.⁴⁹

No exact figures are available concerning the amounts of water available at Marshall for full-scale snowmaking, yet the Greens estimate that the supply is more than adequate. Marshall's slopes have

⁴⁷ Ibid., p. 230.

⁴⁸ Mike Maginn, "Snowmaking in Transition," p. 46.

⁴⁹ "The Economics of Snowmaking," Ski Area Management, Summer 1966, p. 38.

numerous natural springs that flow year round and creation of reservoirs near these springs could supply the needs of normal snowmaking operations. In addition a large stream at the base of the slopes could be dammed to provide water for periods of heavy snowmaking.⁵⁰

An article on snowmaking in Skiing Area News recommends snowmaking as early as possible each season. The first regular series of below-freezing night temperatures during November are suggested for best results. Good snow for the Thanksgiving holiday would take advantage of the skier's early season enthusiasm.⁵¹

Average minimum night-time temperatures at the Missoula airport for the month of November have been 21 degrees for a 30 year period.⁵² The Greens have kept records of temperatures for the past few years and estimate that Marshall averages 3 or 4 degrees colder than airport temperatures. Review of average temperatures during the winter months for the past 40 years suggest that snowmaking could begin early enough each season to start skiing by Thanksgiving and continue into March, allowing at least 15 full weeks of skiing most years regardless of natural snowfall.⁵³ Although humidity levels at Marshall are slightly higher than recommended for optimum snowmaking, lower than average suggested temperatures during the season promise to make up the difference.⁵⁴

⁵⁰Si and Velma Green, series of interviews conducted at Marshall Ski Area, May and June 1971.

⁵¹Dick Garis, "Snowmaking's Biggest Problem--Too Much Waste," Skiing Area News, June 1967, p. 31.

⁵²U.S. Department of Commerce, Local Climatological Data for Missoula, Montana 1970 (Washington, D.C.: Government Printing Office, 1971), p. 4.

⁵³Ibid., p. 4.

⁵⁴"The Economics of Snowmaking," Ski Area Management, Summer 1966, p. 38.

In addition to the importance of water, temperature, and humidity, adequate electric power is necessary to drive the seven and one-half horsepower motor of each snowmaking unit. Fortunately the night lighting at Marshall has provided an extensive electrical system that could also provide adequate power on every slope where snowmaking would be required.

CHAPTER XII

ECONOMIC FEASIBILITY

A review of Marshall's operational and financial history along with the ski area industry as a whole point toward snowmaking as having the greatest potential in improving Marshall's long-run profit performance. This review and technological improvements that promise 75 percent lower snowmaking costs strongly suggest the practicability of a detailed economic feasibility analysis of snowmaking for Marshall.

Since it appears reasonable to assume that all technical and physical requirements for snowmaking can be met, the factors of economic feasibility and long-run profit potential become critically important. A break-even analysis will be used to estimate the economic impact of snowmaking. Based on Marshall's past performance and industry experience, projections of skier visits, total revenues, snowmaking costs, fixed and variable costs will be estimated and from these estimates a break-even model for Marshall will be developed. A payback period analysis will examine the feasibility of the proposed investment in terms of cash flows attributed to the use of snowmaking equipment. In addition, profit projections will be made for a three-year period, beginning with the 1971-72 season. Projections beyond this period would be unrealistic as expected increases in skier traffic would require expansion of many facilities in the fourth or fifth years to handle the crowds. A fifteen week season will be used as a standard for projection, thus assuming snowmaking will allow at least 180 operations.

Projected Revenues

An industry study, appearing in the Winter 1969 issue of Skiing Area News, of lift ticket pricing and long-range financial budgeting by Mel Borgerson says that a typical budget starts with an estimate of attendance for each of the projected years. The normal growth factor in the area should be introduced and any additional facilities and capacity reflected in the estimates.

The next essential ingredient is an estimated income per skier visit. This is necessary because there are many different sources of income and types of lift tickets making other methods of estimating expected revenues difficult. Estimates are calculated on an average per skier-visit basis. These estimates for projection must be based on historical operational data.⁵⁵ This method outlined in Borgerson's article will be used to project Marshall's revenues for a three-year period.

A government study of skiing trends published in 1967 proposed that annual increases in the number of visits to western ski areas, (including Montana), have been closely related to annual increases in population size, per capita income, and amount of leisure time. The study revealed that attendance at western ski areas has grown at an average annual compound rate of 19.9 percent between 1960 and 1966, and is expected to continue at this rate for about ten years.⁵⁶

⁵⁵Mel Borgerson, "Lift and Tow Ticket Pricing," Skiing Area News, Winter 1969, pp. 31-32.

⁵⁶U.S. Department of Commerce, Economic Development Administration, Skiing Trends and Opportunities in the Western States (Washington, D.C.: Government Printing Office, 1967), p. 11.

Table VI shows the comparative growth patterns of skiing in Montana and at Marshall. Fifteen Montana ski areas operating on Forest Service land showed an average annual increase in skier visits of 17.9 percent. Marshall's varying season length for the last five years makes any comparison based on total yearly skier visits unrealistic; however,

TABLE VI

SUMMARY OF SKIER VISITS BY SEASON FOR FIFTEEN MONTANA
SKI AREAS OPERATING ON FOREST SERVICE LAND

Montana Areas ^a			Marshall ^b	
Season	Tot. Skr. Vsts. ^c	% Increase	Skr. Visits Per Operation ^d	% Increase
1963-64	135,063			
1964-65	178,933	32.5%		
1965-66	167,700	(9.5%)		
1966-67	229,400	37.0%	113	
1967-68	252,800	10.0%	138	22.1%
1968-69	309,400	22.3%	193	40.0%
1969-70	357,900	15.5%	187	(3.1%)
1970-71	419,700	17.4%	212	13.3%
Avg. Ann. % Increase		17.9%		18.1%

^aU.S. Forest Service--Northern Region, "Summary of Skier Visits by Season," (unpublished report, 1971) (mimeographed).

^bInformation collected from Marshall Ski Area log books 1966-67

^cSkier visit: A measure of attendance, generally the total number of lift tickets issued. Skier visits include full day, half day, complimentary, adult, child and season tickets.

^dSkier visits per operation: This figure is calculated by dividing the total yearly skier visits by the total number of operations.

comparing the annual increase in skier visits per operation yields a more useful statistic for comparison. Marshall has enjoyed an average annual increase in skier visits per operation of 18.1 percent over the past five seasons.⁵⁷ Based on the close agreement of these growth patterns it will be assumed that Marshall will experience an 18 percent yearly increase in skier visits per operation for the next three seasons.

Revenue projections will be based on expected skier visits per operation and revenues collected per skier visit. The 1968-69 season will be used as a base year for projections of average income per skier visit.⁵⁸ This was the only year since the installation of cable type lifts that has approached 15 weeks of continuous operation, and more closely resembles the seasons anticipated with the use of snowmaking equipment.

Data presented in Table VII shows incomes per skier visit for the 1967-68, 1969-70 and 1970-71 seasons to be considerably higher than those collected during the 1968-69 season.⁵⁹ Since prices for lift tickets, ski lessons, food and merchandise have remained about the same for the past four seasons, the higher figures are due mainly to differences in operating schedules. Marshall's log books of daily operations indicate that a greater percentage of operations for the seasons showing higher

⁵⁷Comparison of attendance data has been made only for years that Marshall has been operating with cable type lifts (e.g., Poma and t-bar lifts), which has drastically increased public appeal. Prior to 1966, Marshall had only rope tows which serviced a limited amount of skiing terrain.

⁵⁸Income per skier visit: The total gross income from all sources received by the ski area as a result of one skier visit.

⁵⁹The income per skier visit for the 1966-67 season is not comparable as it does not include revenues from ski school operations.

TABLE VII

PROJECTED EXPECTED REVENUE DATA FOR MARSHALL SKI AREA
WITH THE USE OF SNOWMAKING EQUIPMENT

	Recorded Data ^a (no snowmaking)				Projected Data (snowmaking)		
	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
Season in Weeks	12	15	13	14	15	15	15
# of Operations	88	155	91	80	180	180	180
Skier Visits							
Per Operation	138	193	187	212	250 ^b	295	348
Total Skr. Vst.	12,100	30,000	17,000	17,000	45,000	53,100	62,640
Income Per Vst.	\$ 2.85	\$ 2.16	\$ 3.00	\$ 3.20	\$ 2.41 ^c	\$ 2.41	\$ 2.41
Income Per Op.	\$ 394.00	\$ 416.00	\$ 564.00	\$ 685.00	\$ 603.00	\$ 710.00	\$ 840.00
Total Season Income	\$34,724.00	\$64,697.00	\$51,334.00	\$54,514.00	\$108,540.00	\$125,800.00	\$151,000.00

^aInformation collected from Marshall Ski Area log books and tax records 1967-68 through 1970-71.

^b18 percent yearly increase in skier visits per operation based on the 212 figure experienced during the 1970-71 season.

^cIncome per skier visit based on calculation presented in footnote number 61.

incomes per skier visit were on week-ends when lift prices and attendance are greater than on weekdays and nights. Snow conditions for the 1967-68, 1969-70 and 1970-71 seasons were considerably poorer than during the 1968-69 season. In years when skiing conditions have been marginal, many weekday and night time operations are cancelled to preserve the snow for the more profitable week-end operations.

In the article by Mel Borgerson, it is suggested that gradual increases in lift prices are necessary to offset increases in cost of operations. He states,

"There was general agreement among all operators that the most logical time to increase your lift prices is after you have added new facilities and have increased your services."⁶⁰

Gross revenues during the 1968-69 season averaged \$2.16 per skier visit. Assuming the installation of snowmaking equipment would justify an increase of 20 percent in lift ticket prices, a figure of \$2.41 will be used as a basis for revenue projections.⁶¹

Assuming Marshall will experience an average annual compound growth of 18 percent per skier visit per operation and average income per skier visit of \$2.41 revenue projections for the next three years are shown on Table VIII. These projections will be made on the assumption that the installation of snowmaking equipment will allow 180 operations

⁶⁰Mel Borgerson, "Lift and Tow Ticket Pricing," p. 31.

⁶¹The figure of \$2.41 per skier visit is based on the following calculations: a) 57 percent of gross revenues in 1968-69 were from the sale of lift tickets, (see Table III, page 30). b) 57 percent x \$2.16 (gross income per skier visit 1968-69) = \$1.28 (amount per skier visit attributed to lift ticket sales). c) 20 percent (increase in lift prices) x \$1.23 = \$.25 (expected increase in revenue per skier visit by increasing lift prices). d) \$2.16 + \$.25 = \$2.41 total expected income per skier visit assuming a 20 percent increase in lift ticket prices.

each season, representing 15 continuous weeks of skiing, 12 operations per week. The 1970-71 season figure of 212 skier visits per operation will be used as a basis for projection of attendance.

Projected Costs

This section compares Marshall's revenues, expenses, length of season, number of operations per season and costs per operation for the past five seasons, 1966-67 through 1970-71. Previous years are not included because cable type lifts were not used prior to 1966. It is the purpose of this section to establish cost data to be used for projection. Table VIII on page 60 shows detailed historical data which will be useful in establishing projected costs.

Definitions concerning information contained in Table VIII are as follows:

1. Total income: All lift income plus the gross income from ski school, cafeteria, ski shop and ski rental.
2. Profit: The net operating profit before taxes. Interest income is excluded.
3. GFA: Gross fixed assets: The original cost (undepreciated) of all the fixed assets used to generate ski lift, ski school, day lodge cafeteria, ski shop and ski rental income.
4. Returns to GFA: This is a ratio of profit to gross fixed assets. It is useful as a measure of earning power because it eliminates such variables as debt-equity mix.
5. Length of seasons: A figure stated in number of weeks shows the length of the skiing season at Marshall measured from the first day of operation to the last. Any week with one or more operations is counted as a full week. Projected figures will be based on a fifteen-week season, 12 operations each week.
6. Number of operations: An operation is defined as one day or night that lifts are running. The total number of operations each year depends on the length of season and skiing condition from week to week. Marshall's normal operating schedule is 12 operations weekly, 7 days and 5 nights.
7. Cost per operation: This figure breaks total operating expenses in each category (e.g., wages, sales, operations, and

administration) into cost per operation by dividing the total number of operations that season into total operating costs.

8. Skier visit: A measure of attendance, the total number of ski lift tickets issued.
9. Income per operation: Total yearly income from all sources divided by the number of operations that season. It is used as a projection figure and represents the average expected income as a result of each operation.
10. Income per skier visit: The total gross income received by the ski area as a result of one skier visit.
11. Total operating expenses: All expenses arising from the operation of Marshall Ski Area. Some operating expenses vary with the number of operating days and others with the dollar volume of business.

Operating expenses are:

- a. Labor: Labor is broken down into two wage categories, general and ski school. The general category includes payroll for lifts, trails, maintenance and ski patrol. Ski school represents all wages paid to instructors for services rendered on an hourly basis.
 - b. Sales: The sales category includes all expenses for advertising, public relations, promotion, ski shows, films, press releases, newspapers, brochures and related marketing functions.
 - c. Operations: The operations category includes repairs and maintenance, supplies, electricity, fuel and water, and outside services.
 - d. Administration: Included in this category are payroll taxes, accounting and legal fees, automotive, telephone, contributions, dues, travel, miscellaneous expenses and liability insurance costs.
 - e. Resale merchandise: This category reflects the costs of goods sold in the cafeteria and ski shop but excludes any labor costs, etc. This expense is fully variable.
 - f. Forest Service land use fee: This expense represents rent paid for use of National Forest land. It is a graduated fee based on a percentage of gross receipts for each season.
 - g. Snowmaking: All operational costs for snowmaking (e.g., labor, water, electricity) are shown as a separate category for comparison purposes. Marshall has not used any snowmaking equipment in the past.
12. Total fixed expenses: All annual expenses arising from the existence of Marshall Ski Area. These expenses are generally fixed once the investment in fixed assets is established. In the future, rent for land leased from the U.S. Forest Service will be based on a graduated rate fee schedule which is calculated on a percentage of total gross income. This fee has

been fixed for the past two years but will be variable beginning with the 1971-72 season and will be considered under operating expenses.

- a. Insurance: All insurance charges, excluding liability insurance, which arise from the existence of certain fixed assets.
- b. Property taxes: This category includes all local and state real estate and personal property taxes.
- c. Land lease fees: The land use category includes rental payments to the Anaconda Company and the U.S. Forest Service for the use of leased land.
- d. Depreciation: The depreciation category includes depreciation as reported. Assets are depreciated on both a straight line basis and a declining balance basis. Most asset lives are calculated on a five or ten year basis.
- e. Interest: Interest includes all payments for the use of borrowed funds. Presently interest is being paid on two separate loans, one to finance the Poma lift in 1965 and the other to finance the t-bar in 1969.
- f. Snowmaking: This category will include fixed expenses (i.e., interest and depreciation) incurred from the installation of snowmaking equipment. This equipment would include nozzles, reservoirs, pipes, pumps, electrical wiring, etc.

Projections of future costs will be based on an analysis of Marshall's cost data for the last five seasons. All operating cost projections based on gross revenues will be adjusted to allow for increases due to the change in lift prices. Projections of snowmaking costs will be based on the latest industry estimates using the Airless Snow Machines International system.

Under Marshall's present accounting system, detailed marginal cost analysis for projection purposes would be very difficult. No attempt has been made to analyze the cost of operating each lift, cafeteria, ski school and ski shop. The fact that some employees work in several different operations as the need arises and a lack of accurate records and data pertaining to use of electricity, fuel, etc., further complicate analysis.

TABLE VIII

MARSHALL SKI AREA - COMPARATIVE COST AND REVENUE DATA
1966-1967 THROUGH 1970-1971 INCLUDING PROJECTION ESTIMATES

Data Facilities Season	Recorded Data ^a											
	4 Ropes						1 Poma					
	1966-1967			1967-1968			1968-1969			1969-1970		
	Expns.	Cost Per Oper.	% of Gross Rev.	Expns.	Cost Per Oper.	% of Gross Rev.	Expns.	Cost Per Oper.	% of Gross Rev.	Expns.	Cost Per Oper.	% of Gross Rev.
Operating Expenses												
A. Labor												
General Wages	\$3172	\$27.60		\$2970	\$34.00	8.6%	\$7402	\$48.00	7.2%	\$5877	\$65.00	8.4%
Ski Sch. Wages	none			3000			4637			4309		
TOTAL	3172			5970			12039			10186		
B. Sales												
Advertising	1314	11.50		2133	24.00		2363	15.25		1522	16.75	
C. Operations												
Reprs. & Maint.	1807			2240			5125			1768		
Supplies	555			872			1222			1391		
Outside Service	35			75			261			none		
SUBTOTAL	2397	21.00		3187	36.00		6607	43.00		3159	35.00	
Elec. Fuel Wtr.	1536	13.40		1373	15.60		1547	10.00		2053	22.60	
TOTAL	3931			4560			8154			5212		
D. Administration												
Acctg. & Legal	547			226			210			395		
Automotive	358			376			709			511		
Telephone	101			121			191			275		
Dues & Subscrip.	100			110			160			140		
Miscellaneous	17			38			24			412		
Contributions	10			15			10			398		
Trvl. & Entertmt.	28			84			179			590		
SUBTOTAL	1221	10.60		970	11.00		1383	8.90		2721	30.00	
Liability Ins.	223		.91%	512		1.5%	1000		1.54%	2185		4.26%
Payroll Tax ^b	197		(6.2%)	368		(6.2%)	741		(5.2%)	525		(5.2%)
TOTAL	1641			1850			3124			5431		
E. Resale Mdse.												
Ski Shop & Cafe	3061		12.3%	5097		14.7%	7315		11.3%	5361		10.5%
F. F.S. Use Fee												
Graduated Fee ^c	none			none			none			none		
G. Snowmaking												
Lbr. Wtr. Elec.	none			none			none			none		
Fixed Expenses												
A. Insurance @Fire	\$ 511			\$ 784			\$ 851			1,420		
B. Prpty. Tax & Lcn.	140			287			420			421		
C. Land Lease	200			200			300			706		
D. Depreciation	8257			7107			6926			14,569		
E. Interest	2236			1893			1732			2,582		
F. Snowmaking	none			none			none			none		
TOTAL	11,344			10,271			10,229			19,698		
Profitability												
A. Total Income	\$24,890			\$34,934			\$64,697			\$51,334		
B. Total Expense	24,465			29,881			43,379			47,410		
C. Profit	425			5,053			21,318			3,924		
D. GFA	56,265			59,520			63,656			119,826		
E. Return to GFA	.76%			8.5%			30%			3.2%		
Season												
A. Weeks	13			12			15			13		
B. # Operations	115			88			155			91		
C. Skier Visits	13,000			12,100			30,000			17,000		
D. Visits/Oper.	113			138			193			187		
E. Income/Visit	\$1.91			\$2.85			\$2.16			\$3.00		
F. Income/Oper.	\$216.00			\$394.00			\$416.00			\$564.00		

a. Source: Information collected from Marshall Ski Area log books, tax records and income statements 1966-1967 through 1970-1971.

b. Payroll tax in () is based on percentage of total wage costs.

c. Projections of Forest Service land use fees based on formula presented on page

d. Projections based on historical data will be made assuming that snowmaking equipment will allow at least fifteen weeks or 180 operations each season.

e. Projections of ski school wages and resale merchandise are based on 89.6% of expected gross income to correct for increases due to changes in lift ticket price.

			Projected Data ^d (using snowmaking equipment)				
1970-1971			Projected Costs		1971-1972	1972-1973	1973-1974
Expns.	Cost Per Oper.	% of Gross Rev.	Cost Per Oper.	% of Gross Inc. ^e	4 Ropes	1 Poma	1 T-Bar
\$9296 4240 <u>13536</u>	\$116.00	7.8%	\$90.00	8.0%	\$16,200 7,770 <u>23,970</u>	\$16,200 9,016 <u>25,216</u>	\$16,200 10,850 <u>27,050</u>
1134	14.20		16.30		2,930	2,930	2,930
3697 1989 <u>5</u> 5691 1488 <u>7179</u>	71.00 18.50		41.00 20.00 61.00		7,380 3,600 <u>10,980</u>	7,380 3,600 <u>10,980</u>	7,380 3,600 <u>10,980</u>
555 644 305 112 400 170 809 <u>2995</u> 2248 768 <u>6011</u>	37.50	4.12% (6.4%)	19.60	3.85% (5.8%)	3,530 4,175 <u>1,390</u> 9,095	3,530 4,840 <u>1,470</u> 9,840	3,530 5,820 <u>1,570</u> 10,920
4811	8.9%			11.5%	11,200	12,950	15,600
none			1% to 8% of adj. gross income		477	732	1,070
none			26.00		4,700	4,700	4,700
1,442 411 575 13,943 3,811 <u>none</u> 20,182			1,442 420 400 13,000 3,500 <u>11,461</u> 30,223		1,442 420 400 13,000 3,500 <u>11,461</u> 30,223	1,442 420 400 13,000 3,500 <u>11,461</u> 30,223	1,442 420 400 13,000 3,500 <u>11,461</u> 30,223
54,514 52,853 1,661 122,000 1.4%					108,540 93,575 14,965 202,000 7.4%	125,800 97,571 28,229 202,000 14%	151,200 103,473 47,727 202,000 23%
14 80 17,000 212 \$3.20 \$685.00			15 180 \$2.41		15 180 45,000 250 \$2.41 \$603.00	15 180 53,100 295 \$2.41 \$710.00	15 180 62,640 348 \$2.41 \$840.00

Operating Costs

Projections of operating costs will be made on a cost per operation or percent of gross revenue basis, for each category. They will be formulated on historical data presented in Table VIII. Examination of the data in this table shows costs per operation in each category have generally fluctuated widely in the past five seasons. This fluctuation is mainly due to changes in certain variables, (i.e., number of operations per season, length of season, size of labor force, wage rates, insurance rates, etc.). These variations combined with a few years' operating experience using cable type lifts makes trend projections of operating costs difficult. For these reasons only rough estimates of projected operating costs can be made; however, they should be accurate enough to illustrate the economic impact of snowmaking at Marshall.

Projections based on past experience will be made for each category. Operating cost categories must be handled separately because some vary with gross revenues and some with the number of operations, while others are assumed to be more or less fixed. It will be assumed that the number of lifts and size of cafeteria and ski shop will remain fixed for the projected period.

Labor Costs

Ninety dollars per operation will be used as the general wage figure for projection. This figure is an average of the past two seasons' experience. It is higher than previous years but reflects more closely the general wage expenses that will be incurred for the next few years, assuming that the size of plant and wage rates remain the same. At least one additional employee was used during the last season to handle the increased load of maintaining two cable lifts.

Generally, it can be said, although skier visits per operation are expected to increase, the larger crowds can be handled by the same number of employees. The number of patrolmen, lift attendants, cafeteria and ski shop workers required for each operation is the same for large crowds as it is for small, within reasonable limits.

Projections of ski school labor costs will be calculated on a percentage of expected gross revenues. Industry experience indicates that ski school revenues and costs increase as the area's overall business increases.⁶² Marshall's ski school wages have been close to 8 percent of gross income in each of the past four seasons. The projected figure will be 8 percent of expected gross income on the assumption that wage rates and the ratio of ski school wage costs to gross income remain the same.

Sales Expense

A projected figure of \$16.30 per operation for sales expense was arrived at by averaging the cost per operation for the past five seasons. This item represents advertising expenses which are primarily semi-variable costs. This cost is a management-controlled cost and should not increase with expected increases in skier traffic.

Operations

An average of the costs of repairs, supplies and outside services per operation for the past five years gives a projection figure of \$41.00 per operation. A separate projection for power costs was made based on the last two seasons of operation only. An average cost of \$20.00 per operation is a more accurate figure, reflecting higher power consumption due to the addition of the t-bar lift.

⁶²Cal Conniff, "Ski Schools are for Selling Lift Tickets," Ski Area Management, Winter 1969, p. 29.

Administration

An average of all the administrative expenses, excluding payroll taxes and liability insurance, for the 1966-67 through 1970-71 seasons yields a projection figure of \$19.60. These items generally vary with the number of operations. Liability insurance, however, varies directly with the dollar volume of business and will be considered separately. Historical costs were not considered in establishing the percentage for projection. A new liability policy has been written for the next few years and the dollar cost of this insurance will be computed at a rate of 3.85 percent on the yearly gross income. Other insurance costs (e.g., fire and life) are a fixed amount for the season and will be considered under fixed expenses.

Payroll taxes are directly related to total wage costs. Percentages expressed in Table VIII represent the ratio of payroll taxes to total wages. These percentages show only small variations for the past five seasons. An average for these years gives a figure of 5.8 percent for projection.

Resale Merchandise

It will be assumed that the cost of food sold in the cafeteria and ski shop will vary directly with the total incomes from all sources. The projected figure of 11.5 percent is based on the average costs of merchandise sales, excluding labor, as a percentage of total revenue for the last five years.

Forest Service Land Use Fee

During the 1969-70 and 1970-71 seasons a fixed fee of \$175 was charged for use of 70 acres of land located on National Forest property. Prior to the installation of the t-bar in 1969 none of Marshall's

operations were on Forest Service property. The fixed fee was considered a temporary construction charge.

Beginning with the 1971-72 season, Marshall will be charged a graduated fee based on a percentage of gross receipts for use of Forest Service Land. This fee is calculated on the following basis:

<u>Sales as a Percent of GFA</u> ($\frac{S}{GFA}$)	<u>Applicable Rates</u>
First 25 percent	1 percent
Second 25 percent	3 percent
Third 25 percent	6 percent
Fourth 25 percent	8 percent

Note: Since a small part of Marshall's operations are on Forest Service land, only 22 percent of its sales are assessed.

Fixed Expenses

Projections of fixed expenses will be made on a cost per season basis. Most of these expenses are firmly established and can be projected accurately. Fixed snowmaking costs will be based on the best industry estimates available at this time. Snowmaking will be considered separately for comparison purposes.

Insurance

Fixed insurance expenses have remained the same for the last two seasons and are not expected to increase with the installation of snowmaking equipment. The 1970-71 season figure of \$1442 will be used as a projection estimate for the next three years.

Property Tax and Licenses

Examination of these costs shows that they have remained about the

same for the last three seasons. A figure of \$420 per season would be representative of actual costs expected in this area.

Land Lease

The 1969-70 and 1970-71 expenses shown in Table VIII represent charges for land leased from the Anaconda Company and the U.S. Forest Service. In the future the Forest Service Fee will be an operating cost and only the Anaconda fee will be considered. This fee has been set at \$400 yearly and is expected to continue at this rate for the next three seasons.

Depreciation

Review of Marshall's amortization schedule shows that total depreciation charges will vary only slightly over the next three years. The figure of \$13,000 represents the average yearly depreciation cost calculated for the projected period.

Interest

A projected yearly interest charge of \$3500 represents the average expected expense over the three year projection period. This cost has varied somewhat over the past two years. The lower figure for the 1969-70 season reflects only a portion of the yearly interest on Marshall's second loan, because it was secured part way through that season.

Snowmaking Costs

Estimates of snowmaking costs at Marshall using the airless Wollin machines manufactured by Snow Machines International (SMI) will be based on the latest industry information found in Skiing Area News, Ski Area Management and literature published by the SMI company. Conservative projections will be made for a three year period assuming the most unfavorable natural snowfall conditions.

Size of Snowmaking Installations

The snowmaking system under consideration for projection purposes would be large enough to cover a full 20 acres of ground, 5 acres on the Junior and Intermediate hills and the 15 acre Challenger run parallel to the Poma lift. No snowmaking equipment for the slopes adjacent to the t-bar lift will be considered at this time. During the past two years natural snow cover on the upper slopes has been adequate for good skiing most of the season. The initial size and cost of the SMI system is as follows:⁶³

20 SMI airless units @\$1900 =	\$38,000	\$38,000
6000 ft. water pipe, reservoir and pumps		32,000
Electrical wiring & service		<u>10,000</u>
Total installed cost		\$80,000

Fixed Costs

It will be assumed that the total cost of the snowmaking system will be financed by a local bank loan. Mr. George Schotte, head of the Small Business Administration, Helena, Montana, estimated the interest rate on a loan for a system of that type would be 8 percent.⁶⁴

Following Marshall's standard ten year straight line depreciation schedule, projected fixed costs for the proposed snowmaking system are:

Principal amount of loan	\$80,000
Estimated average interest cost per year--8 percent	3,461
Yrly. depreciation cost based on straight line method with 10 year useful asset life	<u>8,000</u>
Yrly. fixed cost of snowmaking	\$11,461

⁶³Estimates based on SMI information presented in an article by Mike Maginn, "Snowmaking in Transition," Skiing Area News, Fall 1970, p. 46.

⁶⁴Telephone interview with Mr. George Schotte, Helena, Montana, June 30, 1971.

Operating Costs

Snowmaking operating costs consist of labor and electricity. Projected snowmaking costs will be made for the next three seasons assuming the poorest possible natural snowfall conditions. If no natural snow fell during a season, industry data indicates that about sixty days of snowmaking would be required to provide good skiing conditions for a fifteen week season. At an average of 8 hours per daily snowmaking session, about 480 hours of snowmaking would be required each season.⁶⁵ Assuming a two man crew would be required to handle the equipment, the following represents the estimated cost of 480 hours of snowmaking operations:⁶⁶

Labor

1 foreman @ \$3.50 per hr.	
1 crewman @ \$2.50 per hr.	
	\$6.00 hourly labor cost
	x 480 hours
	<u>\$2880.00</u>
	290.00 estimated payroll tax
	<u>\$3170.00 total seasonal labor cost</u>

Electricity

160 KWH @ 2 cents per KWH	\$ 3.20 per hr.
	<u>x 480 hours</u>
Total electrical costs	\$1536.00
	<u>3170.00</u>
Total seasonal operating cost of snowmaking equipment	\$4706.00

Assuming 180 operations each season, the total variable snowmaking cost per operation will be:

⁶⁵"The Economics of Snowmaking," Ski Area Management, Summer 1966, p. 39.

⁶⁶Estimates based on prevailing local wage rates and cost of electrical power. Power requirements are SMI estimates.

• Total seasonal operating cost of snowmaking equipment	\$4706
Total number of operations	180
Cost per operation	\$ 26

Preliminary tests of the SMI equipment show that maintenance costs are extremely small. Because the maintenance costs for the first three years are expected to be minimal and no accurate industry data was available, an estimate of this cost will not be included.

Break-Even Analysis

The break-even graph on page 71 illustrates the economic effect of the proposed snowmaking system at Marshall Ski Area for the 1971-72 season. Data for construction of this model is taken from Table VIII. The shaded portion of the graph represents the fixed and variable costs of snowmaking. These costs have been separated for comparison purposes. Distances from the revenue line R'R' to the total cost line C'C' represent profits without the investment in snowmaking equipment. Distances from the revenue line R'R' to the total cost line S'S' represent profits using the proposed snowmaking installation.

To facilitate comparison some important assumptions must be made:

1. Snow conditions without snowmaking equipment will allow 106 operations. A figure of 106 operations was determined for projection purposes by averaging the total number of operations each season for the last five years. The actual season experienced could be longer or shorter depending on natural weather conditions.
2. Snow conditions using the proposed snowmaking system will allow at least 180 operations. This assumption is based on the discussion in the Technical Considerations section of Chapter XI and the experience most ski areas have had using snowmaking equipment under similar weather conditions.
3. All operating costs are fully variable. If break-even analysis is used all costs must be considered either fixed or variable. In actual practice some of Marshall's costs (e.g., advertising, contributions and maintenance costs) are semi-variable but to facilitate the analysis they are considered to be fully

variable. Most of these semi-variable costs vary closely with the number of operations making a projection based on the number of operations accurate enough for illustration purposes.

4. Revenues per operation and all fixed and operating costs per operation will remain the same with or without the use of snowmaking equipment. The fixed and operating costs are considered separately to facilitate comparison.
5. All profits are before tax. This eliminates any distortions or profits that would result from the differing corporate tax rates at certain levels of profitability.

Point A is the break-even mark for Marshall Ski Area at its present level of investment (\$122,000 GFA) with no snowmaking equipment. This point represents 70 operations and gross revenues of \$42,000.

Point B represents a season similar to the one experienced in 1970-71, when poor snow conditions allowed only 80 operations. Expected revenues would be \$48,000 leaving a profit of \$3,000.

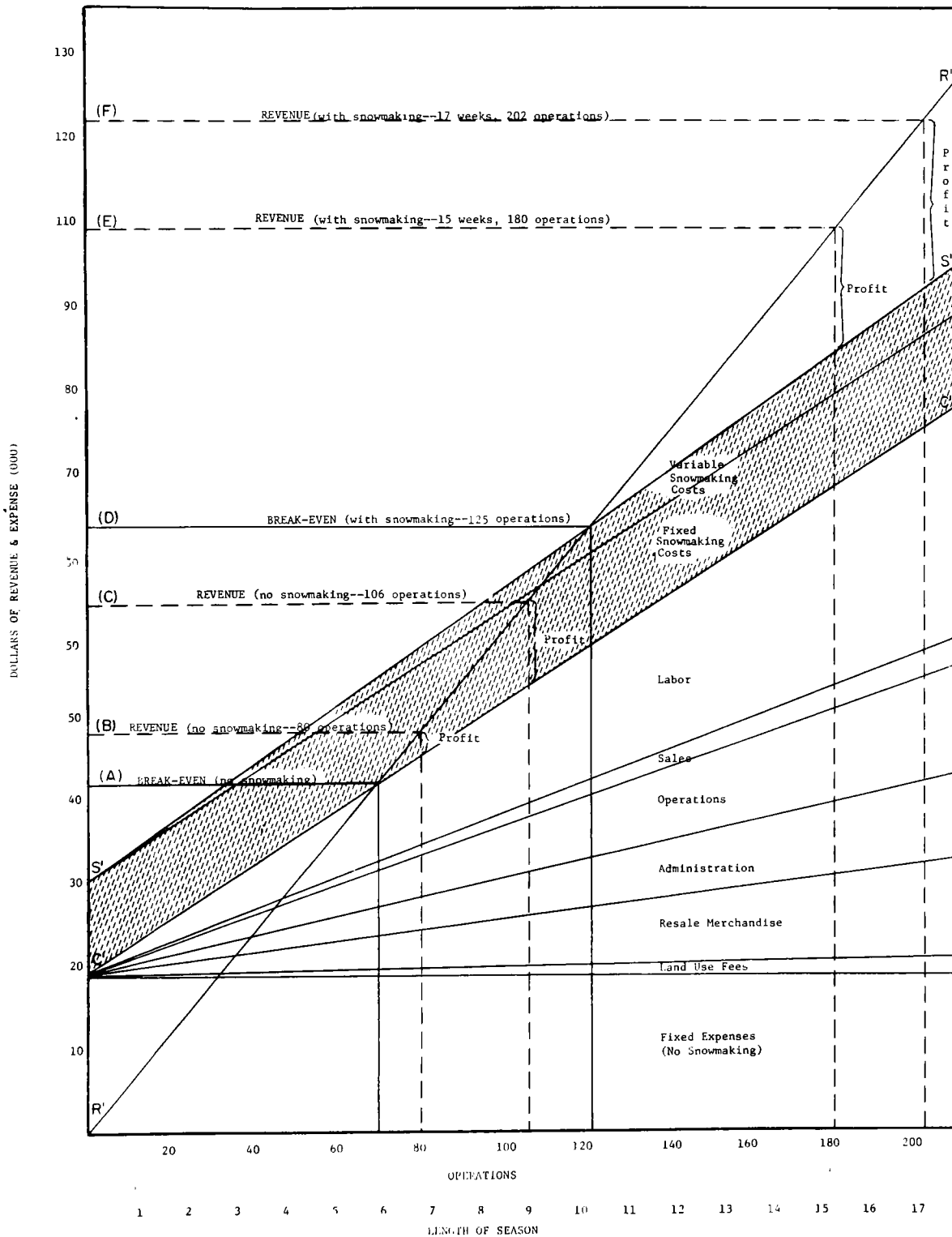
Point C represents the expected number of operations (based on a five year average) without using snowmaking equipment. A profit of about \$10,000 would result from 106 operations.

Point D is the break-even level of operations for Marshall using the proposed snowmaking system (\$202,000 GFA). One hundred twenty-five operations are necessary to reach this point resulting in gross revenues of \$73,000.

Point E represents the hypothetical fifteen week season of 180 operations using the proposed SMI snowmaking system. At this point gross revenues would be about \$108,500, and realizing a profit almost \$15,000. Returns to GFA would be 7.42 percent.

Point F represents gross incomes if snowmaking operations would allow 17 weeks of continuous skiing or 202 operations. Profits at this level would be close to \$20,000, about 10 percent return to GFA.

EXHIBIT III
BREAK-EVEN ANALYSIS
MARSHALL SKI AREA 1971-1972



Several points deserve discussion. Marshall has been growing in popularity represented by increases in the number of skier visits and revenues per operation. If this trend continues the break-even level can be reached in a shorter season with fewer operations. Increases in lift, ski school and cafeteria prices would increase the slope of the revenue line $R'R'$ and decrease the length of season necessary to break even. Additional facilities, a beer stube or sledding run would help to increase the total revenues collected each operation. It should be noted, however, that the effectiveness of these measures to increase revenues and profits would be greatly reduced in years of poor snow and limited operations.

Although the addition of snowmaking equipment would not increase revenues per operation per se, it would help to lengthen the season and increase the total revenues collected each year. The graph shows that the installation of snowmaking equipment would move the break-even point from 70 operations to 121 operations. It is important to note that point E, the profit expected using snowmaking equipment, is the minimum projected length of season. This implies that the chances of reaching profit level E using snowmaking equipment are much greater than the chances of reaching profit level C with no snowmaking equipment. In many years a level of profits approaching those represented by point F could be anticipated with the use of snowmaking equipment. Without this equipment, past experience at Marshall indicates that in some seasons profits can be expected below the level represented by the 106 operations at point C. If another season similar to the one experienced in 1970-71 should occur, profits would be held to about \$3,000 represented by point B. It is also possible that an even worse year could reduce the number of operations below those necessary to break even.

Payback Period Analysis

The payback period is the number of years it would take Marshall Ski Area to recover its original investment in an \$80,000 snowmaking installation from the expected increases in net returns before depreciation but after taxes. The assumptions made in the Break-Even section will apply to this analysis.

Comparisons will be made assuming annual growth rates of 13 and 18 percent. Thirteen percent represents the expected annual rate of revenue increase if the annual growth for the projected period were to drop to the level experienced in the Western states during the years 1956-64. The 13 percent figure is a more conservative estimate of annual growth that could occur depending on national and local trends (e.g., increases in population size, per capita income, and amount of leisure time.)⁶⁷ The 18 percent annual growth figure is based on recent growth trends in Montana and at Marshall. The analysis for determination of this figure is presented in the Projected Revenues section.

Table IV shows projected incomes and after-tax profits with and without the use of snowmaking equipment at the two aforementioned growth rates. Table X shows the net cash flows attributed to the use of snowmaking equipment and the number of years it would take the investment to pay for itself at each of the projected rates of growth.

At an average annual growth in revenues of 18 percent the proposed

⁶⁷ The 13 percent annual growth figure and the analysis of influencing factors is presented in: U.S. Department of Commerce, Economic Development Administration, Skiing Trends and Opportunities in the Western States, 1969 (Washington, D.C.: Government Printing Office, 1969), p. 11.

TABLE IX
MARSHALL SKI AREA--PROJECTED INCOMES AND PROFITS
FOR SEASONS 1971-72 THROUGH 1976-77^a

Item		No Snowmaking 106 Operations			Snowmaking 180 Operations		
Ann. Growth Rate	Season	Total Income	Net Profit	After- Tax Profit ^b	Total Income	Net Profit	After- Tax Profit
13%	1971-72	\$61,100	\$ 7,800	\$ 5,600	\$104,000	\$10,500	\$ 7,600
	1972-73	69,300	16,000	12,500	117,500	24,000	17,200
	1973-74	78,800	25,500	18,300	133,400	39,800	24,100
	1974-75	88,900	35,700	21,600	150,700	57,200	32,400
	1975-76	100,500	47,300	27,900	171,200	77,700	42,100
	1976-77	113,500	60,300	34,300	193,500	100,000	50,000
18%	1971-72	64,100	11,000	7,900	108,540	15,000	10,750
	1972-73	73,900	20,800	15,150	125,800	28,200	20,000
	1973-74	89,000	35,800	22,800	151,200	47,700	29,500
	1974-75	105,500	52,300	29,100	179,000	85,500	45,500
	1975-76	118,000	64,800	35,600	200,500	106,000	53,000
	1976-77	132,000	78,800	42,400	224,500	130,000	65,000

^aMarshall Ski Area will be incorporated by the 1971-72 season.
Taxes computed at present Federal and State corporate tax rates.

^bCalculated from: Table VIII Marshall Ski Area--Comparative Cost and Revenue Data 1966-67 Through 1970-71 Including Projection Estimates. Figures are rounded to the nearest hundred.

TABLE X

MARSHALL SKI AREA--PAYBACK ANALYSIS FOR
INVESTMENT IN SNOWMAKING EQUIPMENT^a

Net Cash Flows From Use of Snowmaking Equipment (profit after tax plus depreciation) ^b				
Season	13% Annual Growth Rate		18% Annual Growth Rate	
	Yearly	Accum. Total	Yearly	Accum. Total
1971-72	10,000	10,000	10,850	10,850
1972-73	12,700	22,700	12,850	23,700
1973-74	13,800	36,500	14,700	38,400
1974-75	18,800	55,300	24,400	62,800
1975-76	22,200	77,500	25,400	88,200
1976-77	23,700	101,200	-	-
Payback Period	5.11 years		4.68 years	

^aCalculated from: Information presented in Table IX, Marshall Ski Area--Projected Incomes and Profits for Season 1971-72 Through 1976-77.

^bCash flows for each year represent the difference in after-tax profits for operation with snowmaking (180 operations) and without snowmaking (106 operations) plus the yearly allowance for depreciation on the snowmaking installation (\$8,000).

snowmaking equipment would pay for itself in 4.68 years. If the slower growth rate of 13 percent was experienced it would take 5.11 years to recoup the \$80,000 investment.

The short period of payback at both rates of growth are favorable to the proposed investment in the snowmaking system. This relatively quick return of investment funds would make later investments in other facilities such as lifts and a larger lodge more promising than if a longer period were incurred.

Payback period analysis is limited in the conclusions that can be made concerning certain investment proposals. It ignores the fact that the useful life of this investment may be longer than the ten year period used to calculate the depreciation charges. It also does not take into account that the revenues from 180 operations each year is the minimum expected and that the payback period would be considerably shorter if even longer seasons were possible with the use of snowmaking equipment. Other benefits that can be attributed to the use of snowmaking at Marshall will be discussed in the following section.

Projected Profits and Long Run Potential

The figures for the 1971-72, 1972-73 and 1973-74 seasons found in Table VIII represent projections based on the assumption that the installation of a snowmaking system at Marshall will insure at least 180 operations; a full fifteen weeks of skiing each year. The projected data is based on conservative estimates formulated in the foregoing analysis of Marshall's operations. Marshall's present maximum capacity is about 1100 skiers per operation. This factor limits the number of years for which valid projections can be made with the present facilities. Peak capacity is expected to be reached in the third season on certain days

such as the Christmas holidays and some week-ends as skier visits on busy days may be three or four times the average skier visit per operation figure.

Previous discussion has indicated that a season of 180 operations is highly unlikely under natural conditions but would be almost certain with the proposed snowmaking system. What effect will this proposed system have on Marshall's overall profit picture and growth rate? The projections of this paper are relatively short term because of expected increases in skier visits and the limited number of skiers that can be handled on peak days, yet some definite conclusions can be reached.

Incomes per operation have shown significant increases over the past five years but several short seasons have resulted in very low profits. Profits have ranged from a low of \$425 to a high of \$21,318, averaging about \$6500 over a five year period. In two of these years the ratio of profits to GFA was below 1.5 percent. Without the aid of artificial snowmaking, low levels of profits can be expected to continue with the possibility of large losses in years with very poor snow conditions.

Assuming that the use of snowmaking equipment at Marshall will allow 180 operations each season and revenues will increase 18 percent annually, projections for a three year period show profits growing from \$14,965 in 1971-72 to \$47,727 in 1973-74. Returns to GFA are expected to rise to 23 percent for the 1973-74 season. If the popularity of skiing in the Missoula area continues to grow and weather conditions permit the snowmaking equipment to lay down sufficient snow cover each year, further increases in the level of profits can be expected. Incomes

and profit figures assuming a 13 percent annual increase in total revenues are shown in Table IX, page 74.

In addition to increasing the level of profits, snowmaking facilities would greatly reduce the level of risk experienced in the past. Each year Marshall's degree of success has hinged almost entirely on the weather which has proven to be completely undependable in providing good skiing conditions. The proposed snowmaking installation could guarantee good skiing and healthy profits even during extremely sparse snow years. This reduction in the level of risk not only would protect Marshall's present investment in lifts and related equipment but would stimulate expansion of the existing facilities. With the insurance of higher profits and adequate cash flows to cover the cost of added improvements, additions such as a chair lift and a larger lodge would be feasible.

Skiing conditions at Marshall have changed almost from day to day during the past sixteen seasons, and considerable time and expense has been incurred when operations had to be cancelled for short periods of time. Much advertising is necessary to inform the skiers of cancellations and resumptions in operations. Many skiers have been discouraged from returning to Marshall after trying out the slopes under marginal conditions.

Snowmaking would almost eliminate any cancellations during the season and the guarantee of good snow all winter might stimulate season ticket sales and increase the total number of skier visits. If snowmaking efforts in November could provide good skiing during the Thanksgiving holidays tremendous crowds could be attracted, taking advantage of early season enthusiasm and the possibility that other Montana areas might lack adequate snow early in the year.

CHAPTER XIII

CONCLUSIONS AND RECOMMENDATIONS

The Greens are looking forward to their sixteenth continuous season at Marshall with their usual enthusiasm. It has taken years of constant toil to build Marshall into the successful and potentially profitable ski area it is today. They have done an admirable job in keeping the costs of operations and improvements low. Although no formal plan was followed, they have been able to gear the level of investment and improvements to the increasing demand. They have distinguished the basic problems inherent in their business and solved most of them in a cautious but efficient manner, yet one basic problem still exists. Two or three years of very poor snow would seriously hurt Marshall's financial condition and public image. Intensive grooming of the trails will continue in an effort to utilize every inch of snow that falls. In 1969 the t-bar lift was installed above the Poma lift to increase total capacity and to take advantage of better snow conditions at the higher elevation; however, the last two years' experience has proven that this was not the final answer.

Many ski areas across the country have almost completely eliminated their snow problems by making artificial snow, but in the past the high cost of installing and operating snowmaking equipment has ruled out this solution for Marshall; however, recent changes in the technology of

snowmaking have so drastically reduced the costs that it should prove economically feasible for Marshall to install the new airless type equipment.

The detailed economic analysis presented in Chapter III concerning the proposed installation of the new airless snowmaking system at Marshall indicates a tremendous potential. Its use would not only result in higher long-run profits but would virtually eliminate the risk of poor snow years thus protecting the present investment in lifts, tows and lodge facilities. Investment in new lifts and related facilities would become more promising with the possibility of a few poor snow years eliminated. Stimulation of additional investment in better and expanded facilities could mean larger profits and a better competitive position.

A detailed engineering study should be conducted at Marshall to determine the exact costs of installing the snowmaking equipment, and to confirm the estimates presented in this study. The cost of an engineering study by the SMI company could be minimal if Marshall were chosen as a test area for the new airless snowmaking equipment. The use of two or three snowmaking units this coming season would provide valuable data as to the effectiveness of the process under Marshall's weather conditions and help in the design of a full scale installation. Extensive use of two units could provide some early skiing on the lower slopes around the lodge and might increase enthusiasm for regular season operations. A limited ski school program for beginners could be started ahead of the regular season if early snowmaking efforts proved successful.

The future at Marshall looks promising. If snowmaking proves successful the outlook for expansion and development will be greatly increased, and years of poor snow at Marshall will be a thing of the past. Skiers may soon be enjoying good skiing all season even if "Mother Nature" fails to provide adequate natural snow.

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